

THE COAST ARTILLERY JOURNAL



Features

Capture of the Baltic Islands

Green-Lanham

Preparation of Antiaircraft Fire

Harris

The Red Army

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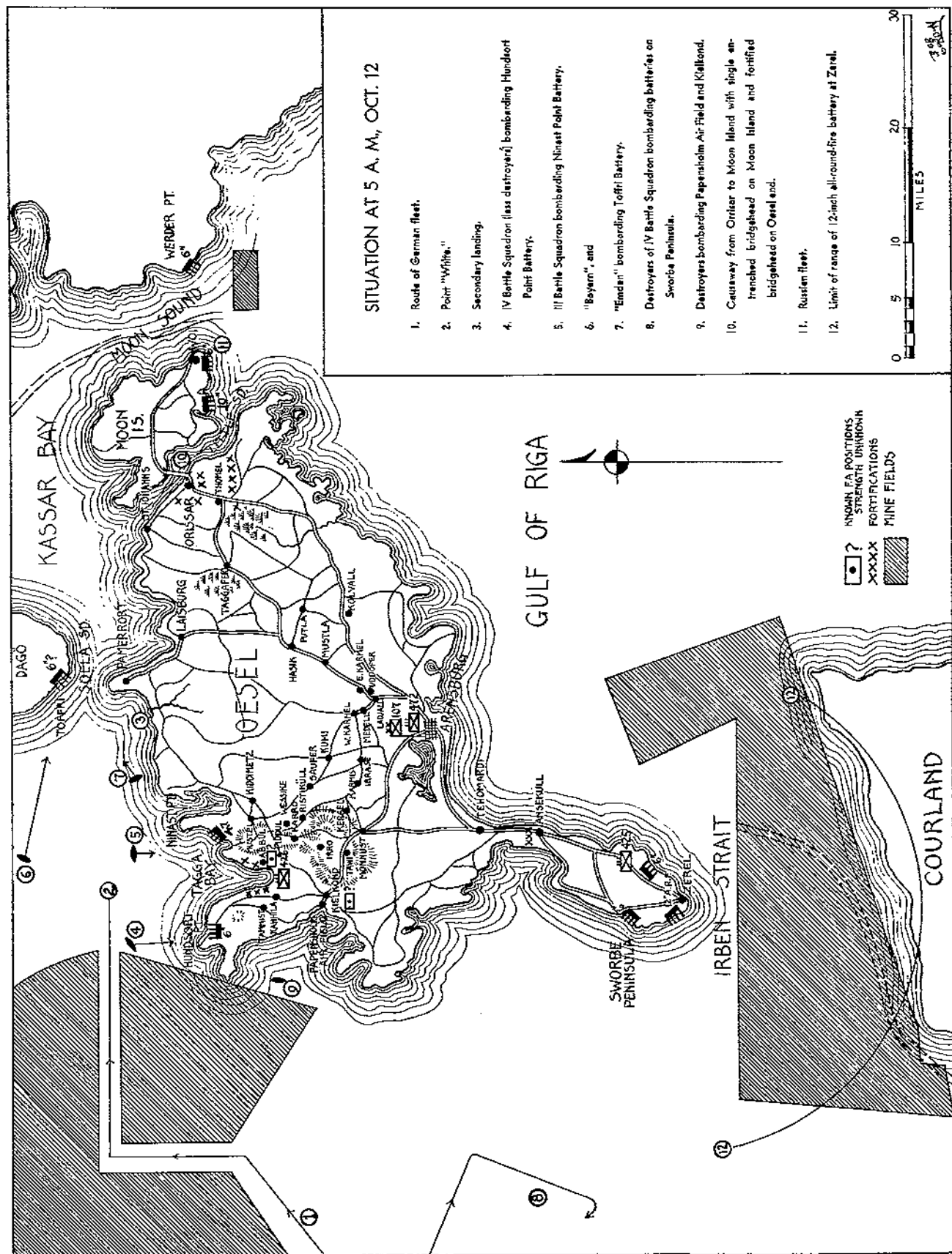
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Map 2. showing original Russian dispositions and initial German operations.

The Invasion and Capture of the Baltic Islands

BY LIEUTENANT COLONEL FRED M. GREEN
Coast Artillery Corps
and CAPTAIN C. T. LANHAM
Infantry

IMPERIAL Russia had fallen. In the palace of the Czars sat an ineffectual little man called Kerensky, while from the Baltic to the Carpathians the apathetic *moujik* spelled out the astounding provisions of the new régime's General Order No. 1. Not for some time would the full significance of that order sink through his thick skull. When it did . . . but that's another story.

Meanwhile Germany relaxed . . . relaxed and waited for the inevitable dissolution of a great empire. March, April, June came and passed quietly. Then the stricken colossus rose and struck blindly at Galicia. German retaliation was rapid. First an avenging smash to the southeast in July and then, in the first days of September, a lunge to the northeast and the left flank of von Hutier's Eighth Army stood along the Gulf of Riga. The stage was set for the second great joint operation of the World War!

* * *

The Baltic Islands stand like teeth in the mouth of the Gulf of Riga. Behind this imposing denture Russia's Baltic fleet held undisputed control. For two years this fleet had threatened the left of Germany's long eastern battle line; for two years it had operated intermittently against the flank of her indispensable supply routes to the Scandinavian states. Now, in September of 1917, with the flank of the Eighth Army poised in Riga, that threat increased. Berlin spoke: the Gulf of Riga must be swept clean; the supply routes safeguarded; the cities of Dunamunde and Riga converted to German ports for the supply of the eastern armies.

* * *

From the point of view of the German navy, idle since Jutland, nothing would have been simpler than the destruction of Russia's Baltic fleet in an out-and-out naval fight. Unfortunately, two serious obstacles intervened: the well-armed seacoast forts of the Baltic Islands and the mine-infested waters that guarded the islands and blocked the gulf. There was only one answer . . . the teeth in the mouth of the Riga Gulf must be drawn. Here was a task worthy of a great navy, a great army, and a great commander. Germany had all three.

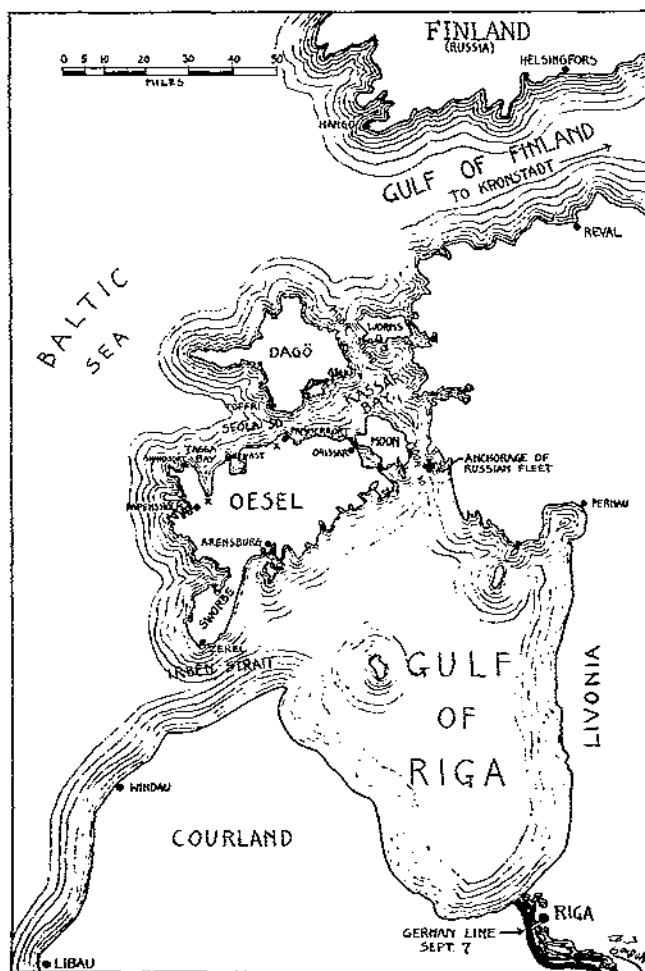
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With the bloody fiasco at Gallipoli as a model of what not to do, the German Supreme Command at once put the projected operation against the Baltic Islands on a sound footing. On September 19 a curt order directed

Here was a task worthy of a great navy, a great army, and a great commander. Germany had all three.

General von Hutier, the brilliant commander of the Eighth Army, to organize and *take command* of a joint army-navy expedition charged with the mission of capturing Oesel and Moon Islands and blocking the Gulf of Riga to hostile naval forces. The same order named Vice Admiral Schmidt as commander of the naval component. Thus England's first major mistake at Gallipoli was not repeated; no mythical cooperation between army and navy was assumed; the supreme command fell squarely to one man—von Hutier.

This order did not take the Eighth Army commander by surprise. In anticipation of just this thing he and his



Map 1—The Baltic Islands stand like teeth in the mouth of the Gulf of Riga.

staff had already made a fairly comprehensive study of the problems that now confronted them. The strength and dispositions of the Russian garrisons on Oesel and Moon Islands had been carefully checked and brought up to date. The fortifications and armaments of the two islands had been similarly verified. The resulting picture is shown in essential detail on Map 2.

From the naval point of view the information was almost as precise. Russia's naval force in the Gulf of Riga consisted of several older battleships and cruisers, a flotilla of modern destroyers, and a swarm of smaller craft. In addition to this none-too-formidable array, 34 Russian submarines were definitely known to be active in the Baltic, and Hango had been spotted as the base from which eight British underwater craft had been conducting their depredations against German shipping. Four modern dreadnaughts, reported in the Gulf of Finland, completed Russia's Baltic armada.

The German Admiralty might well have wished for a little less precision on Russia's third-rate fleet and a little more on her first-rate mine fields. It was common knowledge that extensive and exceptionally ingenious mine fields blocked the entrances to the Gulf of Riga. For instance, Irben Strait was barred to the invader by row after row of different type mines arranged in irregular patterns and set at varying depths. Both the northern and southern entrances to Moon Sound, and large areas about Dagö Island were known to be similarly mined. Although this information permitted protective measures, it was far from comforting, for in the opinion of Germany's naval experts, Russia's mines and mine defenses had no equal.

Three general types of mines were employed in these waters. "The little fish," carrying a 40-pound charge and set for a submergence of two or three feet, was designed to handle shallow-draft vessels such as destroyers, patrol boats, and small mine-sweepers. The second type, popularly known as the "pearl mine," carried several charges spaced vertically along a single anchor cable. This pattern was evidently intended to take its toll among those submarines that sought to traverse the *verboten* areas by submerging to great depths and passing under the planted fields. The third, and most common type, carried 440 pounds of explosive and was normally set from six to sixteen feet by automatic anchors. Well might such a systematic mine defense bring consternation to the most daring German sailor.

In summary then, before a single soldier could set foot on Oesel or Moon Island, the German navy had to run the gauntlet of the mine fields, silence or circumvent the Russian coast defenses, and at the same time be prepared to handle the enemy's Baltic fleet should that force decide to dispute the issue. One comforting thought remained: demoralization, even mutiny, was rampant in Russia's army and navy. Perhaps the fleet would not intervene; perhaps the fed-up Russian soldier would not fight his powerful seacoast batteries. But though dry-rot ate the heart out of the soldier and sailor it would not

attack the already planted mine fields.

To complete the known factors in the problem confronting the expedition we must now turn to the Baltic Islands themselves. Oesel, garrisoned by the 107th Division (see Map 2 for dispositions), was not only the largest island in the group but also the most important. The powerful 12-inch battery on Sworbe Peninsula dominated Irben Strait; in fact, it could even reach the mainland. The island itself commanded all approaches to the other three since Moon Sound was fortified and mined and Kassar Bay was too shoal to be negotiated by sea-going vessels. Arensburg, boasting a population of 5,000, was the only town of consequence in the entire group. The Russian line of supply ran from this town to Orissar thence across a two-mile causeway to Moon Island, over Moon Island by road, and then to the mainland by ferry.

The importance of Moon Island lay mainly in the fact that it commanded Moon Sound which, with the exception of Irben Strait, provided the only navigable entrance to the Gulf of Riga. Moon Sound afforded the most direct sea route to the Russian naval bases at Helsingfors, Reval, Hango and Kronstadt in the Gulf of Finland. Finally the Russian fleet was based in the southern end of the sound. For these reasons, then, the capture of Moon Island was only second in importance to the capture of Oesel.

With this we conclude our thumb-nail panorama of the enemy as seen by General von Hutier and turn to a consideration of the German forces that could be spared for this operation.

* * *

No longer was Germany's man power a drug on the market; the great reservoirs were nearly dry. The terrible Battle of Flanders was running its appointed course. The gigantic assault on Italy was almost at hand. Only one brigade of cyclists could be spared from the Western Front for this adventure in the storm-whipped Baltic. Von Hutier would have to furnish the remainder of the army contingent from his own depleted Eighth Army. This he did, moving two war-hardened divisions and the necessary auxiliaries from the thin eastern battle line to Libau. In all, the personnel and matériel assembled at this well-equipped port of embarkation included: 23,000 officers and men; 5,000 horses; 1,400 vehicles; 150 machine guns; 54 field guns varying in caliber from 3 inches to 8 inches; 12 trench mortars; and rations, ammunition, and supplies for 30 days.

While von Hutier, by a considerable feat of military *legerdemain* was conjuring up this invading force, the navy was similarly engaged. Eventually, about 270 ships of all classes were mustered. This force included one battle cruiser, ten of the latest dreadnaughts, eight modern cruisers, and six submarines, and a swarm of destroyers, patrol boats, and mine sweepers. Seventeen large merchantmen and four smaller ships were earmarked for the transportation of troops and supplies. These transports, totaling about 150,000 tons, were ob-

viously unable to handle the entire expeditionary force and its impedimenta in one trip, but it was the best the navy could do.

Seventy-five planes, of which all but seven hailed from the navy, were to be the eyes of the expedition. It is probable that von Hutier experienced some misgiving when he learned that the 68 naval aviators had never worked with army troops and were totally inexperienced in land missions. But in any event the commander in chief now knew the strength and composition of the force with which he would have to work and had an unusually accurate picture of the opposition he would have to overcome. He was now ready to shape his plan of invasion.

* * *

Since Oesel Island was clearly the first objective, Libau with its splendid harbor facilities was the logical base of operations, and, as mentioned earlier, it was so designated. At the same time Windau was selected as the advanced base for the air force and the mine-sweeping flotilla.

The next problem—the selection of landing sites—did not present such an obvious solution. Oesel Island is generally low, flat, and swampy, and its deeply indented shore line is characterized by shallow, marshy bays. From Pamerrort eastward to Orissar the waters of Kassar Bay were too shoal for sea-going transports. From Orissar to Sworbe Peninsula the Russian fleet held undisputed sway behind the great mine fields that blocked Irben Strait. Nor could these fields be swept so long as the powerful guns at Zerel remained active. This same long-range coast artillery rendered any thought of a landing operation on the western side of Sworbe Peninsula out of the question; transports could not run that deadly gauntlet and live. From the Isthmus of Sworbe to Hundsort Point and from Ninast Point almost to Pamerrort, extensive shoals prevented the close approach of sea-going vessels. Thus by a process of elimination only two practicable sites for *initial* landings remained: Tagga Bay and a few small beaches just west of Pamerrort. Both had disadvantages.

The beaches near Pamerrort were too small to permit a landing in force. Only small detachments could be set ashore in this locality. The transports would be forced to lie far off shore unprotected from the great storms that drive in from the north and west. Finally the approaches to the beaches were dominated by the seacoast batteries at Toffri and Pamerrort. These were telling disadvantages.

Tagga Bay at least had some good points to offset the bad. It offered a safe, deep harbor that was sheltered from storms on all sides save the north. It was large enough to provide safe anchorage for the German naval force, and its beaches were sufficient to permit a landing in force. Once the fleet rode at anchor in the bay the submarine menace could be countered by a net across the mouth. Finally German submarines had reported the

important fact that Tagga's waters were free of mines. On the other side, the picture was none too bright. A 6-inch battery at Hundsort and a 4.7-inch battery at Ninast glowered at each other across the mouth of the bay. Furthermore, Tagga's wooded shores were known to be garrisoned by a Russian infantry regiment, supported by field artillery, and to be well prepared for defense.

Despite these disadvantages there was no question of choice. Since Tagga Bay afforded the only possible landing site for a large force—Tagga Bay it would be. The overwhelming gun power of the naval escort would account for the two seacoast batteries; surprise and the great German infantry would have to account for the rest.

By September 23 General von Hutier had completed his plan. On the next day this was incorporated in an order and published to the expeditionary force. Since this plan later underwent drastic revision we need only note here that the operation was scheduled to start on September 27—three days after publication of the order. This meant headlong haste—the treacherous expedient on which more than one joint operation has dashed itself to pieces.

Fortunately for the Germans bad weather intervened. On the 26th a great storm blew out of the north. The mine-sweepers that had been dispatched to clear a channel through the Baltic were unable to accomplish their work in the teeth of the mounting gale. They put back. To such proportions did the storm mount that even the naval commander asked permission to withdraw his ships to a less exposed anchorage in the North Sea.

Day after day the wind drove from the north and day after day Berlin grew more impatient at the unavoidable delay. Men were too scarce in the fall of 1917 to sit in a Baltic port and wait the pleasure of the elements. As time dragged on, agitation grew to abandon the whole project. On October 7, however, the great winds died down. Even then three more days must elapse before the transports cleared the Libau breakwater.

Living up to the popular notion of ill winds, this one blew much good. The enforced wait not only revealed many deficiencies in plan and organization but afforded an opportunity to correct them. For instance, it was discovered that the embarkation tables prepared by the Admiralty in Berlin were based on the maximum tonnage loading for each ship and that such vital matters as proper supply priorities and the tactical sequence of units in landing had been utterly disregarded. That some quarters of the Imperial German Admiralty had yet to learn one of Gallipoli's most terrible lessons was all too apparent. Fortunately there was time to repair the error and there were men on hand qualified for the task.

Day in and day out troops were drilled in embarking and landing, and in loading and unloading animals, artillery, vehicles, and supplies. A number of flat-bottomed, pontoon-like barges, with hinged bulwarks at each end, were obtained to lighter horses and vehicles ashore. It is a curious fact, however, that much more emphasis seems

to have been placed on embarkation than on landing. Such procedure smacks somewhat of an aspiring aviator who has only been taught to take off and then directed to solo.

After a few days all the heavy material was properly sorted and permanently stowed away on the transports. One-half of the complement of horses was kept constantly on board; when brought ashore for exercise the others replaced them. In short, everything possible was done to expedite the final phase of loading.

Meanwhile the delay was working for Germany in a still more vital quarter. Every hour brought fresh evidence of Russian demoralization. To the five and a half million Russian soldiers who had fought so many hopeless battles, the world-shaking events transpiring behind their own lines were of far greater moment than the threat of the terribly efficient German army before them. They could always fall back; Holy Russia was too vast to be overrun by an invader.

That such evidence weighed heavily in von Hutier's estimate is shown in the daring details of his final plan. One phase of that plan was to result in one of the most desperate encounters that ever befell any unit in any war. But before we can follow that adventure intelligently we must first set down the various rôles assigned the army and navy. The reader is earnestly enjoined to follow this plan carefully on the map, otherwise the ensuing operation, which is complicated at best, will be meaningless.

The major provisions of the final plan for the invasion and capture of the Baltic Islands follow:

1. *a.* General von Kâthen (commanding general of the XXIII Reserve Corps) will command the *entire* expeditionary force. He will embark on the flagship of the Naval Force.¹
- b.* The naval commander will be in charge until the landing; thereafter he will be subject to the orders of General von Kâthen.
- c.* After the initial landing General von Esteroff will be charged with the immediate tactical direction of troops ashore.

Army Component.

2. Two initial landings will be made: a general landing at Tagga Bay; a secondary landing on the selected beaches west of Pamerrort. Both landings will be made at daybreak.
3. *Tagga Bay.*
 - a.* A Beach-head Force of 3,600 men will land from motor launches, destroyers, and mine-sweepers, seize the shores of Tagga Bay, capture the fixed and mobile armament which covers its approaches, and form a beach-head in preparation for the general landing of the bulk of the expeditionary force. This landing will be effected at any cost.

b. As soon as the Beach-head Force has accomplished its mission the main body will be landed. Once the main body is ashore, it will drive southward, capture Arensburg, capture and occupy the fortified Sworbe Peninsula and thereafter defend Oesel Island.

4. *Pamerrort.*

a. A secondary landing force consisting of 2 cyclist battalions, 400 bluejackets, and the necessary auxiliaries (total about 2,000) will land on the beaches southwest of Pamerrort, with the mission of blocking a Russian retirement from Oesel to Moon Island and preventing any reinforcement reaching the Oesel garrison by way of the causeway from Moon Island. The success of this maneuver (*which envisaged the capture of the entire 107th Division*) hinges on the speed with which it is carried out by the cyclists.

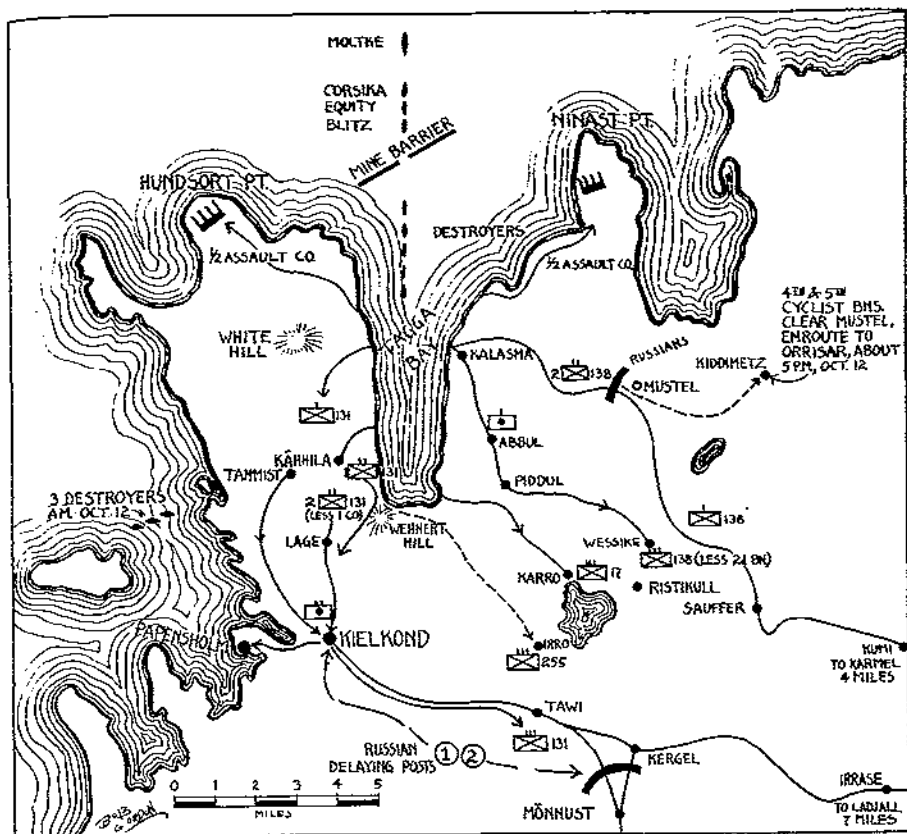
b. Immediately upon landing, one cyclist battalion will move rapidly eastward to Orissar, seize the causeway and prevent the passage of the enemy in either direction. The remaining cyclist battalion will at once move south toward Arensburg, harass the hostile rear, and in case the enemy's reserve at Arensburg withdraws, delay its retirement, in order to prevent the battalion at Orissar from being overrun before reinforcement can arrive from the main landing at Tagga Bay.

c. The bluejackets will capture the battery at Pamerrort. Every effort will be made to capture this battery intact.

Naval Component.

5. The Navy will sweep a channel to the vicinity of Oesel Island at once. Under cover of darkness, on the night before the landing, this channel will be extended to reach Tagga Bay. Until that time no operation will be undertaken which would suggest an intent to operate anywhere north of Irben Strait.
6. The Navy will convoy the transports through the mine fields west of Hundsorrt Point during the hours of darkness. "Beacon ships," carrying lights visible from the sea but screened from the shore, will mark the channel swept through the mine fields.
7. Tagga Bay and its approaches will be secured from hostile submarines by the use of nets, listening devices, and patrol boats. One submarine will be stationed off the north of the bay on the alert for any heavy surface ships of the enemy.
8. The Navy will secure Tagga Bay from hostile naval attack, paying particular attention to the possibilities of an attack from the direction of Moon Sound. Two submarines posted off the southern exit of Moon Sound and 3 submarines (plus a newly-laid mine field) off the northern exit will contain the Russian fleet. A landing-force battery of 4-inch guns will be set up at St. Johannis (east of Pamerrort) to enfilade any possible debouchment of Rus-

¹In view of the fact that only a small portion of his entire command had been detached for duty with the expeditionary force, General von Hutier decided that he should remain at Eighth Army headquarters on the mainland. Von Kâthen then became the actual, if not the titular commander of the expedition.



Map 3—The landing at Tagga Bay and operations to midnight, October 12-13.

sian destroyers from the northern exit of Moon Sound. As soon as the Sworbe fortifications have fallen our navy will enter the Gulf of Riga and undertake the destruction of the Russian fleet.

9. A force of destroyers will cooperate with the cyclists landing near Pamerrort. These destroyers will move through Kassar Bay into Little Sound. Specifically they will (1) protect the north flank of the cyclist force during its march from Pamerrort to Orissar; (2) support its operations about Orissar by fire; and (3) supply it.
10. The naval commander will take the necessary steps to support the eventual land assault on the Sworbe fortifications by naval fire.
11. As soon as the Sworbe batteries are silenced light naval forces will run by Irben Strait, support the army in its attack on Arensburg, cover the advance of troops to Moon Island, and interrupt communication from Moon Island to the mainland, thus cutting off all retreat from both islands to the mainland.

In effect the foregoing provisions constituted the general framework of the final plan. One other item—*secrecy*—remains to be considered before we turn to the operation proper.

As time wore on it became apparent that the Russian forces on Oesel Island were expecting attack. German aviators and spies reported increased activity in the Russian garrison. Since the fact that an attack was brewing was now an open secret, the Germans had only one possi-

ble hope to effect a surprise—deceive the enemy as to the actual object and location of the attack. This they attempted to do in various ways. Reports were allowed to leak out that St. Petersburg (at the head of the Gulf of Finland) was the real objective of the expedition. Although this story came too late to be altogether convincing, it did offer a fairly plausible explanation and it did tend to undermine the confidence of the Kerensky government. To further confuse the issue and to lend weight to a theory that the attack was to be directed against the Gulf of Riga, air raids were launched against various points along the shore with especial attention to the Sworbe coast defenses, and dirigibles were sent out to demonstrate in the Gulf of Finland. Only once, and then as if by chance, did a German plane fly over Tagga Bay. The pilot's report was most encouraging; he had seen no unusual Russian activity in that area. The German

mine-sweepers operating in Irben Strait and the aviators flying over the Sworbe Peninsula were instructed to be as ostentatious as possible in their activities.

To increase still further the chance of surprise, scattered naval demonstrations were to be made at daylight on the morning of the landing against the Sworbe batteries, Kielkond, and the airfield at Papensholm. Even at this distance it seems that the Germans overlooked no reasonable device in securing that decisive element in all landing operations—*surprise*.

THE VOYAGE

At noon, October 10, a division of slow-moving mine-sweepers, followed by the Pamerrort Landing Force in three shallow-draught transports, sailed from Libau. The naval plan called for this detachment, under Commander Rosenberg, to sweep a channel to the prescribed rendezvous point nine miles off Tagga Bay (see Point "White" [2], Map 2). The faster ships of the main convoy were expected to overtake this advance detachment at the rendezvous point at 2:00 A.M., October 12.

The main body sailed from Libau early on October 11 in single column at 10 to 12 knots, in the following order: Mine-searching^a flotilla, *Doflein*, (joining after dark,

^aGerman sources discriminate sharply between—

a. "Mine-searching boats," which were trawlers, old torpedo boats of about 150 tons, or the newer M-boats of about 500 tons, which were built expressly for this purpose. All three of these types were used for sweeping in deep water until mines were located.

b. "Mine-sweepers," which were smaller motor boats of about 15 tons, drawing not over three feet of water. These were employed in water too shallow to be entered by the larger type. They were also used for cleaning up mine fields which had been discovered by the swifter and more powerful "mine-searching boats."

The term "mine-sweepers," as used in this paper, indicates the former class, as this is the more familiar American usage.

en route from Windau).

Destroyer flotilla (advance guard).

Steamers *Blitz*, *Equity*, and *Corsika* (carrying the Beach-head Landing Force for Tagga Bay).

Ammon (mine-sweeper).

Third Battle Squadron (5 battleships).

Battle cruiser *Moltke* (flag). (Command and part of staff of XXIII Reserve Corps aboard.)

Fourth Battle Squadron (5 battleships).

The second section followed at a considerable interval. This consisted of:

"Mine-breakers." (These were freighters loaded with wood, or other buoyant cargo, designed to explode any mines that escaped the drags of the mine-sweepers, and yet themselves remain afloat.)

Frankfort (light cruiser).

A unit consisting of 3 steamers, 6 tugs and 5 lighters (to lay anti-submarine nets across the mouth of Tagga Bay once the fleet was inside).

Oswald (supply ship for the engineers, with wharf material, etc.).

Santa Elena (aviation mother-ship).

Four groups of transports (16 in all), each group led by a light cruiser.

Train and hospital ships.

* * *

Destroyers, zigzagging on both sides of the column, watched for submarines, and all ships were darkened at night. The utmost precautions were taken against any deviation from the channel which had been swept clear of mines. The speed of the fleet was regulated so that no ships should arrive within sight of Oesel Island until after dark on October 11. During the night of October 11-12, its progress through the mine fields was to be guided by the screened lights of the "beacon ships" to be dropped off from Commander Rosenberg's force as they swept a clear channel. The rendezvous, nine miles off Tagga Bay, was to be marked by a submarine showing a screened light.

Everything went smoothly at first. On the night of the 11th, the battleships *Friedrich der Grosse* and *König Albert* turned out of the column to demonstrate against Sworbe Peninsula and at 11:00 P.M. three destroyers were detached to bombard Kielkond and Papensholm. Both detachments were ordered to keep out of sight of land until daybreak. About midnight, however, the unexpected—which can always be expected in war—happened; the fleet, running at 11 to 12 knots, overtook Commander Rosenberg's mine-sweeper flotilla, which had been unable to maintain its schedule, and was making only 5 knots. It was clear that if the fleet kept behind these mine-sweepers, it would not reach the rendezvous point until after daybreak, in which case the landing would have to be made in broad daylight, and surprise sacrificed. On the other hand, to pass the mine-sweepers involved great risk from the dreaded Russian mines. Admiral Schmidt courageously assumed the risk; he ordered the mine-sweepers out of the way, and drove ahead in

Farragut's "damn the torpedoes" style. In war, luck seems to favor the daring; Admiral Schmidt had qualified, and luck rode north with the German fleet. Just before dawn the great convoy reached its prescribed rendezvous; not a ship had been struck! But despite this heroic procedure the fleet was an hour behind schedule. Little time remained for the leading wave to reach the beach at daybreak.

NAVAL BOMBARDMENT

About 4:20 A.M., the various units of the fleet moved to their respective bombardment positions. The Third Battle Squadron (*König*, *Kronprinz*, *Grosser Kurfürst* and *Markgraf*) took station at "5" (Map 2) to fire upon the Ninast battery. The Fourth Battle Squadron (*Kaiser*, *Kaiserin*, and *Prinzregent Luitpold*) moved to "4" to deal with the Hundsört battery. The *Bayern* took station at "6" and the *Emden* at "7" with the mission of silencing the Toffri battery on Dagö Island and supporting the landing at Pamerrort.

While moving to these positions, the *Grosser Kurfürst* and the *Bayern* struck mines. Although both ships sustained considerable damage, they were able to continue on their assigned missions. Unfortunately for the Germans, the effects of the mine that ripped into the hull of the *Bayern* were not confined to that ship. Here is what happened. Just as the *Bayern* plowed into the Russian mine several observers cried out that they had sighted a periscope. Not unnaturally, the source of the explosion was misinterpreted; it was believed that the ship had been torpedoed by a submarine, and a hasty fire was opened. Now this firing, although miles away, was clearly audible at Tagga Bay. There it was promptly interpreted as meaning just one thing—the *Bayern* and *Emden* had become prematurely engaged with the Toffri battery.

At this very moment Admiral Schmidt, on the bridge of the *Moltke*, was just entering Tagga Bay (Map 3), in close support of the landing there. He at once concluded that the noise must inevitably alarm the Russian garrison. If secrecy had already been lost, there was no longer any point in withholding the fire of the other battleships, so at 5:30 he issued radio orders for the whole fleet to commence firing, and the bombardment became general.

The Hundsört battery (four 6-inch guns) soon came to life and began firing at the *Moltke*, which was at close range and must have offered an inviting target. The *Moltke* returned the fire; its third salvo bracketed the battery with a narrow spread, but effected no damage. Before the fourth salvo struck, the battery (smothered by one-half hour's converging fire of the Fourth Battle Squadron, which had closed in from 12,650 to 8,800 yards) had been silenced.

The Ninast battery (four 4.7-inch guns), although manned, never returned the fire of the four ships of the Third Battle Squadron. It was probably neutralized from the start, for after the bombardment its B.C. station was found to have been destroyed, and one gun wholly de-

molished. Incidentally, this battery had armament of the most modern type. Its guns are described as "on casemate mounts," but whether the battery itself was actually casemated is not clear.

The Toffri battery (four 6-inch guns) did reply to the German fire, but only succeeded in damaging one torpedo boat which was leading a flotilla of mine-sweepers into Kassar Bay. It was soon silenced by the combined fire of the *Bayern* and *Emden*.

No return fire came from the vicinity of Pamerrott, and the Sworbe batteries failed to reply to the fire of the two battleships demonstrating against them.

THE TAGGA BAY LANDING

The force to be landed at Tagga Bay had been divided into two distinct bodies: a Beach-head Force, charged with the mission of gaining a first foothold on shore, clearing away hostile infantry, and capturing the fixed and mobile armament bearing on the bay; and a Main Body, which was to be brought in and landed as soon as the Beach-head Force had completed its task.

The Beach-head Force, consisting of 3,600 officers and men, was commanded by Colonel Mathias of the 65th Infantry Brigade, but until landed it remained under the orders of Corvette-Captain Heinecke, Chief of the Second Destroyer Flotilla. The intimate liaison existing between the German army and navy is typified in the fact that the commander of the Beach-head Force and his staff made the entire trip from Libau on board the flotilla leader's vessel.

The joint plan contemplated landing this advance force in three successive waves, in accordance with the table reproduced below:

Wave	Units in Order	Strength	Carried by
1st	9th Company, 131st Infantry	420	10 motor-sailers, to be furnished from ships of the Third Battle Squadron 3 patrol boats from the mine-sweeper flotilla
	1st Company, 138th Infantry		
2d	65th Infantry Brigade Staff	1,030	11 destroyers of the Second Destroyer Flotilla, and 10 motor-sailers from the mine-sweeper flotilla
	10th Assault Company		
	3d Battalion, 131st Infantry (less 9th Company)		
	1st Battalion, 138th Infantry (less 1st Company)		
3d	2d Battalion, 131st Infantry	530	Steamer <i>Blitz</i>
	1st Battalion, 131st Infantry	840	Steamer <i>Equity</i>
	2d Battalion, 138th Infantry	780	Steamer <i>Corsika</i>

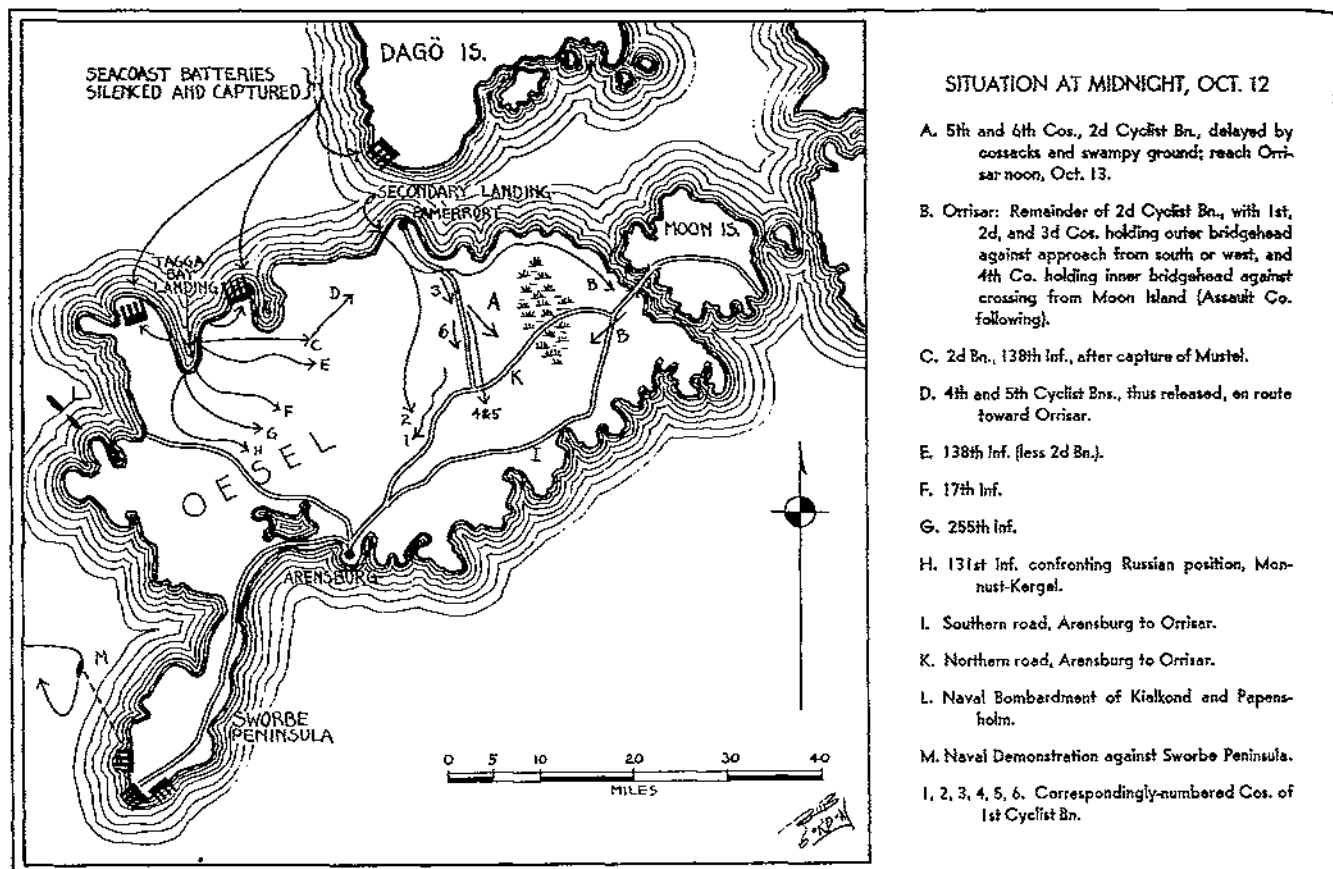
Total strength of Beach-head Force: 3,600 officers and men.

At 4:30 A.M. it was still dark, the sea was smooth, and to all appearances the Russian garrison was utterly unaware of the impending attack. Nine miles off shore Captain Heinecke's destroyers rode at anchor. With what impatience the Captain trod the quarter-deck we can only

surmise, but it is easy to visualize his state of mind as the minutes slipped by toward the six o'clock dawn and the motor-sailers from the Third Battle Squadron failed to put in their appearance. Not until 4:45 A.M., forty-five minutes after the hour appointed to clear the rendezvous point, did the motor-sailers carrying the major portion of the first wave come on the scene. That part of the second wave which had been embarked on ten motor-sailers from the mine-sweeping flotilla and which was scheduled to clear the rendezvous at 4:30 was still further behind. Finally the three small transports that carried the units of the third wave were equally behind schedule.

Here was a nice problem. It was obvious that the slow motor-sailers still nine miles off shore could not hope to reach the appointed landing beaches more than a few minutes before sunrise; indeed they would be lucky if they could accomplish even that. On the other hand, Captain Heinecke's sleek destroyers, carrying the larger part of the second wave, could drive through to the beach in considerably less than half this time. But this possibility was fraught with serious objections. First, a last-minute change of this sort might disrupt the whole plan. Second, if the landing had to be forced in the face of hostile opposition the eleven destroyers crowding in to shore would present a magnificent target. Third, there would unquestionably be great difficulty in landing troops without the assistance of the power boats which, under the plan of the Beach-head Force, were to land the first wave, then return to the destroyers and bring the second wave ashore. Fourth, the disembarkation would certainly alarm the enemy and precipitate hostile reaction. Fifth, even if this part of the second wave succeeded in effecting a landing, there was no way to tell how long it would be before the third wave could be put ashore to support it since the motor-sailers of the first wave would not be available to the third wave for hours. Here were five objections. Against them stood one great argument: unless this expedient were adopted the landing could not be made at the proper time and daybreak would rob the invader of that all-important element in war—*surprise*. What to do?

Admiral Schmidt had set the tempo of daring earlier in the evening; Captain Heinecke kept it up. At 4:40 A.M., he started for the beach with his destroyers and two patrol boats, leaving orders for the other small craft to follow at top speed. By 5:20 A.M. (just before the general bombardment opened) his ships had gained positions off the appointed landing beaches. Landing began immediately. Maximum use was made of the small boats of the destroyers to get the men ashore but the German soldier's devotion to duty was the principal factor in the landing. These men, loaded down by their arms, ammunition and equipment, jumped into the icy water, often breast-high, and waded for the beach, getting ashore somehow by their energy and resolution. Thus isolated groups of infantry landed on both the eastern and western sides of the bay, and without hesitation plunged into the woods.



Map 4.

Meanwhile the German naval bombardment which had started almost simultaneously with the first landing party, had roused the Russians to activity. Several field batteries, concealed in the woods and hitherto undiscovered by German aviators, opened a brisk fire upon the destroyers, and the 131st Infantry, landing on the western shore near White Hill (Map 3), came under fire from a field battery on the opposite side of the bay. Strangely enough, the resistance offered by the Russian infantry during this phase of the fight was negligible.

The rapid-fire guns of the destroyers replied to the Russian field artillery and, supported by this counter-battery fire, infantry companies rapidly assembled on the beach and pushed forward into the woods to form a shallow beach-head. By 7:00 A.M., the 138th Infantry, which landed on the eastern shore opposite White Hill, had captured two field batteries after a short skirmish, and the 131st Infantry had taken two more. The 131st Infantry had no difficulty at all in taking this prize. To the amazement of the troops they found one battery abandoned and the crew of the other still in its dugouts. Russian prisoners told the incredulous Germans a strange tale. They said that for the last nine days they had been almost continually alerted. At last—between exhaustion, the repeated cry of "Wolf!", and the low level to which discipline had sunk—they had become unwilling to respond to any alarm. It appeared further that the Russian officers, already shorn of most of their authority (the men had painted their buttons red and they were wear-

ing the Soviet emblem) had become worn out in their vigilant watch for the expected German attack. One Russian artillery commander, upon being aroused and informed by his orderly that there were strange ships in the bay, replied that they must be Russian ships, and forthwith turned over and went back to sleep.

The Assault Company, landing somewhat farther to the north and on both sides of the Bay, encountered the same state of affairs. The party landing on the eastern side came under a half-hearted and ineffective machine-gun fire as it approached the beach but this soon stopped. Both groups got ashore without losses, and moved rapidly to the seacoast batteries at Hundsort and Ninast Points. Within an hour the 6-inch and 4.7-inch batteries there were captured, together with the naval artillerists who had manned them.

By this time the *Blitz*, the *Equity*, and the *Corsika*, carrying the troops of the third wave, were steaming into the mouth of the bay. The skippers of these three transports must have breathed a sigh of relief as they entered these waters, for Tagga had been reported free of mines. Any lingering doubts about the matter must have gone by the board when it was learned that Captain Heinecke's eleven destroyers had plowed headlong through the bay without misadventure. The captain of the *Corsika* must have been particularly elated to have that perilous night voyage through the uncharted and unswept mine-fields at an end, for his ship carried almost one-fourth of the entire Beach-head Force. That elation was short-lived.

Just as the *Corsika* cleared the mouth of the bay she rammed a Russian mine! Almost instantly she took on a heavy list that proclaimed a mortal wound. Immediately, and despite the obvious danger from the stricken transport, two destroyers forged alongside and succeeded in taking off all the troops. This was accomplished quietly and calmly; all hands behaved with extraordinary coolness. Once this transfer was completed the sinking *Corsika* managed to make the beach.

Meanwhile the *Blitz* and the *Equity* had safely negotiated the bay and were landing their troops. This landing was much expedited by the arrival of the long overdue motor-sailers with the first wave and the remainder of the second wave on board. All elements of the Beach-head Force, save the battalion trans-shipped from the *Corsika*, were actually on shore before 8:00 A.M., and the *Corsika* battalion was landed shortly afterward.

The landing of the Beach-head Force had gone very well indeed. Instead of the expected blaze of fire from the shore, there had been almost complete inactivity. By 7:00 A.M. local Russian infantry resistance had broken down, the seacoast and mobile batteries that threatened the landing had all been captured, and a shallow beach-head had been established. So far no organized resistance had been encountered.

The navy had also done a bang-up job, but it was worried by the implications of the *Corsika's* adventure. Apparently those German submarines that had reported Tagga Bay clear of mines had been unduly optimistic. Mine sweepers, rushing inshore to clear the bay, soon found that the landing force had indeed been fortunate—more fortunate than anyone realized. By sheer luck every ship except the *Corsika* had passed through a gap left in an undiscovered mine barrier laid across the entrance.

While the Beach-head Force was landing, the transports carrying the main body had arrived at the rendezvous point and at 6:45 A.M. had received the signal to come in. Fortunately, the mine field had been discovered and the mine sweepers were at work before these heavily loaded ships reached the entrance. By 8:45 A.M. the first transports of the main body entered the bay and an hour later the disembarkation was in full swing.^a By 11:00 A.M., even ammunition and rations were coming ashore rapidly. The last transport cast anchor about 2:00 P.M.

^aIn his *Study of Combined Operations*, Brigadier General J. E. Edmonds of the British Army states the following points of interest:

"Photographs show the troops embarking in small boats at the ships' sides and being towed ashore in groups of 12 boats, two abreast, by small tugs.

"By 10:00 A.M., the engineers had 6 light piers ready to land the men; but horses, vehicles, and stores were landed on the beach from the horse-barges.

"At 11:00 A.M., a heavy pier was commenced; by 3:00 A.M., on October 13, this was 140 feet long; by 4:00 A.M., October 14, it was 270 feet long, but even then had only 6 feet, 8 inches, of water at its head.

"On October 15, the landing of stores had been practically completed; after that date, all supplies for Oesel were landed on the permanent pier at Arensburg, which had been but slightly damaged by the Russians before their evacuation, and was easily repaired by the invaders."

The 255th Infantry landed at the southwest corner of the bay; the 17th Infantry at the southeast corner; the 138th Infantry, and the three cyclist battalions, on the eastern shore.

By nightfall, four regiments of infantry (the 17th, 131st, 138th and 255th), three cyclist battalions (the 4th, 5th and 6th), and three field batteries were ashore. The machine-gun companies, combat trains, officers' mounts, and the remainder of the artillery were still on shipboard. The Russian naval aviation field at Papensholm, with planes and facilities undamaged, had been captured. The German front line extended from this point on the west around to Kiddimetz on the east. The remnant of the Russian regiment (426th Infantry) that had been assigned the defense of the Tagga Bay sector appeared to be in full flight toward Arensburg.

Lieutenant General Esteroff, in command of all German troops on Oesel Island, had set up his command post ashore. General von Kathen, commanding the Expeditionary Force as a whole, remained on board the flagship *Moltke* with his staff, thus maintaining close contact with the headquarters staff of the naval forces. This procedure was to prove its value repeatedly in the subsequent operations.

Once the transports had been anchored in the bay, a cordon of destroyers drew up about them to handle any fire that might be forthcoming from the shore. A single anti-submarine net was immediately laid across the entrance of the bay; within 72 hours a second net had been added. Two other nets, each 7½ miles long, were laid from Hundsort Point, extending north and northeast. Listening posts were installed to detect the presence of any submarines near these barriers.

So rapidly were the transports unloaded that, by the evening of October 15, six had started the return trip to Libau to pick up the second echelon. Two days later, all of the remaining transports (except four, held to transport troops to Dagö Island) went back for their second load.

The *Grosser Kurfurst* and *Bayern*, damaged by mines, returned to German ports for repair. The Third Battle Squadron (less the *Markgraf*) went to Wick Bay for fuel. Other naval ships in the Tagga Bay area anchored behind the submarine net.

OPERATIONS ASHORE ON THE DAY OF LANDING

About 10:30 A.M., General von Esteroff, convinced that Russian resistance had collapsed, directed the Beach-head Force to extend its initial objectives. At the same hour he issued a division field order assigning the following routes of march:

131st Infantry on Mönnust;

255th Infantry (with 5 batteries to be attached when landed) on the Kergel-Irasse-Ladjall road;

65th Infantry Brigade (17th and 138th Infantry, with 3 batteries to be attached) on the Saufer-Kumi-Karmel road;

4th and 5th Cyclist Battalions, via Kiddimetz and Laisburg, to join the 2d Cyclist Battalion near Orissar;

6th Cyclist Battalion to remain with the division for reconnaissance. (Some of its companies were attached to infantry regiments.)

Immediate march objectives were

Iirro for the 255th Infantry;

Karro for the 17th Infantry;

Ristikiüll for the 138th Infantry.

The 1st Battalion, 131st Infantry, moving via Wehnert Hill (see Map 3), and the 2d Battalion moving via Käh-hila, united near Lage about 10:45 A.M., and marched on Kielkond. The 3d Battalion, which had outposted the landing of the others, followed in reserve. One company of the 2d Battalion, as right flank guard, marched via Tammist.

Not until Kielkond was reached did the 131st Infantry encounter any material resistance. The air corps had reported the town clear of the enemy, but actually it was strongly held. At 2:00 P.M. it fell. The naval air base at Papensholm was occupied at 3:20 P.M.; the airdrome, radio station, and five planes were captured intact. From Kielkond southeast, the country was wooded, and enemy resistance strengthened progressively. The advance was finally brought to a halt a mile north of Mönnust by road obstructions swept by hostile fire. Since landing, this regiment had marched over 17 miles in driving wind and torrential rain; had fought several actions; and had not yet been overtaken by its artillery. It was now almost dark. The regimental commander wisely placed his men in close billets in Tawi.

The 138th Infantry, led by its 1st Battalion, reached Abbul at 8:00 A.M., and captured Piddul after a skirmish. One company, as left-flank guard, was checked by strong, hostile resistance at Mustel. This company was eventually reinforced by the 2d Battalion (delayed in landing owing to the loss of the *Corsika*) and at 5:00 P.M. Mustel was taken, thus opening the road for the 4th and 5th Cyclist Battalions to start their long march to Orissar.

Meanwhile the 3d Battalion, 138th Infantry, had been landed hurriedly from the main body of the transport fleet, and rushed forward to fill the gap caused by the unexpected delay of the 2d Battalion. The 1st and 3d Battalions pushed forward together until nearly midnight. They finally bivouacked in the woods near Wessike. The 2d Battalion bivouacked near Mustel, with a picket of one company on the Mustel-Saufer road, abreast of Wessike.

The 17th and 255th Infantry Regiments, marching on inner routes, had reached their immediate objectives, and bivouacked there, without incident.

During the day, resistance had repeatedly been encountered from scattered Russian detachments, either resisting southward pressure by fire from entrenched positions, or attempting to break through to the east and escape. Enveloping attacks had dislodged such resistance, and many prisoners had been taken.

THE SECONDARY LANDING NEAR PAMERRORT

The force designated to effect the simultaneous second-

ary landing on the beaches west of Pamerrort consisted of about 1,600 soldiers and some 370 enlisted men of the navy, transported on three medium-sized auxiliary naval ships and two shallow-draught torpedo boats, as follows:

Unit	Strength	Carried by
Flotilla Landing Force	200	Torpedo boats
18th Assault Company	250	Auxiliary ship <i>Castor</i> . (Note: 2 horses and 1 field kitchen also carried.)
Bluejackets	130	
Naval artillerists	40	
Detachment of 2d Cyclist Battalion	650	
1st Cyclist Battalion	650	Auxiliary ship <i>Coburg</i> . (Note: 2 field guns of the 8th Battery, 1 caisson, and 30 horses also carried here.)
2d Cyclist Battalion (less detachment)	415	Repair ship <i>Donau</i> . (Note: 2 automobiles and 1 light radio set were also carried.)
Total	1,935	

Upon landing, this force was to be divided into three distinct groups, each with its own mission:

The 1st Cyclist Battalion was to move south in the direction of the Arensburg-Orissar roads, cut telephone lines, interrupt radio stations, capture the divisional staff (reported in a manor-house north of Arensburg), and delay any withdrawal of the Russian 472d Infantry from Arensburg toward Orissar, until such time as the 2d Cyclist Battalion (at Orissar) could be reinforced by the arrival of troops coming overland from Tagga Bay.

The 2d Cyclist Battalion was to move rapidly to Orissar, seize the bridge-head there, and prevent any reinforcements from Moon Island reaching Oesel Island. Its rear would be protected from the hostile forces on Oesel Island by the delaying action of the 1st Cyclist Battalion.

The Assault Company, reinforced by the Flotilla Force, was charged with the capture of the seacoast battery near Pamerrort. Every effort was to be made to capture this battery intact. Thereafter it would be manned by the naval artillerists, and employed (1) to cover Soela Sound, thereby preventing any naval sortie directed against the German fleet unloading at Tagga Bay; (2) to support light German craft in penetrating Kassar Bay; and (3) to neutralize the fire of the Russian seacoast battery (4 guns, variously reported as 4.7" and 6") at Toffri, on the opposite side of the strait. (Mention has already been made of the German project to install a 4" landing-gun battery at St. Johannis, farther east along the coast, to aid in the first and second purposes indicated above.)

The immediate naval escort of this secondary landing force consisted of six small, light-draught torpedo boats and several trawlers. In addition to convoying the landing party, its missions were (1) to locate and buoy a channel through Soela Sound and into Kassar Bay; (2) to make a dash into Little Sound, support the 2d Cyclist Battalion with artillery fire, and furnish it with supplies; and (3) later on, to assist the infantry in forcing a crossing to Moon Island, both by supporting fire and by the ferriage of troops. It will be remembered that in addition to this immediate naval escort the *Bayern* and

Emden were on hand for the specific purpose of neutralizing the seacoast works.

The action opened as the landing force moved toward shore. The first shots came from the battery at Toffri. After several salvos at about 3,400 yards' range, a hit was scored on the stern of one of the small torpedo boats as it was attempting to find a channel into Soela Sound. The *Bayern* and *Emden* promptly opened a heavy and concentrated fire on this battery, which replied feebly for a time, then ceased. Somewhat later it resumed fire, but again subsided under the punishing guns of the two German ships. Later in the afternoon, a landing party went ashore and demolished the battery.

Much to the surprise of the German command, there was no fire from the seacoast battery reported near Pamerort, nor was the landing in progress near there in any way opposed. By 7:00 A.M., the first troops were ashore; and by 10:30 A.M. the landing had been completed save for the field artillery, which could not gain the beach for several days.

Once ashore, the Assault Company and Flotilla Force hastened forward to capture the seacoast battery which had remained so mysteriously silent, and for the future use of which such elaborate plans had been made. The naval artillerists followed, prepared to man the pieces after capture. Everyone hunted diligently, but no battery could be found. Eventually it became evident that the German aviators had been misled by certain installations at a Russian signal station. One gathers that, among other things, the drinks were on the air corps.

The Assault Company, thus rendered surplus, hastily assembled a heterogeneous collection of farm vehicles and animals and set out in the wake of the 2d Cyclist Battalion for the dangerous Orissar bottle-neck.

As for the 2d Cyclist Battalion, it had started its 26-

mile march on Orissar the instant it had landed. It immediately became apparent that the natives of Oesel Island were neither cycle- or motor-conscious; their roads were quagmires! But in spite of this and repeated skirmishes with small parties of the Russians, the leading elements of the battalion completed the 26-mile grind by 9:00 P.M. By noon the next day the remainder of the battalion had reached Orissar and gone into position. En route this battalion had captured 150 men and several military motor cars, one of which contained 200,000 rubles (about \$100,000).

The audacity of this movement becomes apparent when we realize that the force on Moon Island not only outnumbered the cyclists ten to one, but was well equipped with artillery which could fire point-blank at them across Little Sound. To the east, nothing stood between this battalion and an entire Russian division (outnumbering them fifteen to one) except the thin screen formed by the 1st Cyclist Battalion.

While the 2d Cyclist Battalion struggled on toward Orissar, the 1st Cyclist Battalion was moving southward (Map 4: 1 to 6) on a broad front. Russian resistance was sporadic and ineffective.

Two roads lead from Arensburg to Orissar (Map 4). By nightfall, four of the six companies had reached and occupied delaying positions across the northern route (K), but no element of the battalion reached the southern road (I) on this day. Although this unit had not landed at Pamerort until the middle of the morning, its companies had advanced some sixteen miles over bad roads and against varying opposition from both foot and mounted troops. It is amusing to know that the inhabitants, not recognizing the strange uniforms, thought that the cyclists were Englishmen!

(To be continued)



"THERE IS NO DOUBT that to 'obey orders' is a large factor in the problem of military life, because subordination to lawful authority is the bond which holds together the parts which compose all armies, and makes them powerful instruments for good deeds; but something more is required. There must be some to give orders; and it is for these that instruction is chiefly needed."—GEN. W. T. SHERMAN.

Exterminating the Biggest Bug

BY CAPTAIN C. M. CONZELMAN, C.A.C.

OUR present system of determining lateral deviations in seacoast target practice provides no check against personnel errors. It seems to be accepted as a truism that any officer can determine these with sufficient accuracy; if he cannot, there is nothing much to be done about it. From observations and a study of the problem, I have formed definite convictions to the contrary. They are:

- (1) Errors in determining lateral deviations do occur with considerable frequency.
- (2) The errors are of such magnitude as to distort the splash-position picture and affect the accuracy of target practice reports.
- (3) Hits are sometimes unscored because of such errors.
- (4) At a very small outlay of time and material, these errors can be eliminated or materially reduced.

Before accounting for these beliefs let me describe the observations referred to and explain how I came to make them. In preparing for a 155-mm. gun target practice last year, the battery commander, noting the importance of accurate fire adjustment, called upon the range officer to devise a method for training spotters; this resulted in the construction of the Fort Pickens Sand Spotting Range.

This range is a device by which an invisible agent can produce realistic splashes, at prearranged deviations from a visible target. The spotters are located at a considerable distance from the target, thus removing the feeling of a false situation engendered by a miniature range. The topography of Pensacola harbor is particularly well adapted for the purpose; a base end station at Fort Barrancas, equipped with a Warner-Swazey azimuth instrument, from which the Fort Pickens sea-wall, three thousand yards distant, can be seen. First we located a point at the approximate center of the visible part of the sea-wall; upon this we directed the vertical wire of the observing instrument. A soldier equipped with a field glass was stationed on the wall. By means of signals it was a simple matter to mark on the far side of the sea-wall $.05^\circ$ intervals, right and left of the center.

A series of "canned" deviations were prepared, each consisting of twelve salvos—each salvo of two shots. For drill the spotter at B', when he was ready to observe, signalled "take time." At this signal the soldier on the wall started a stop-watch and sent the members of the Splash Detail to the point for the splash of the first salvo of the hypothetical series of impacts. At the expiration of the time of flight he called "Number One" and, two seconds later, "Number Two." The splash detail was not visible from the observing station. At the proper time each in turn threw a shovelful of sand as high as possible; the spotter saw a fairly realistic representation of a splash.

This remained visible for a shorter period than a splash made by a medium-caliber shell; consequently the spotter faced a more difficult problem than he was likely to encounter in target practice.

The spotting range was operated for a month prior to the first sub-caliber practice. Accurate records were kept of each spotter's performance and the results analyzed. Out of twelve soldiers initially selected, only five developed into qualified spotters. Three of the initial group could not spot and were dropped after the third drill; they had normal vision and better than average intelligence, but they failed to pick up the splashes.

Out of the five who qualified only three were usually making perfect scores in drill. These spotted for all target practices and their work was excellent. In several of the 2.95 sub-caliber practices the range spots closely agreed with deviations reported by the range rake detail.

From the records it was discovered that errors did not occur according to the dispersion ladder, either as to magnitude or position on the reticule. Errors were as likely to be of $.05^\circ$ as $.10^\circ$ —an indication that wild guesses are usually made when the spotter does not pick up a splash with certainty. Of the "lost shots," ninety per cent were distributed equally throughout the field of vision; in other words, nearly one-third of the lost shots were hits in direction.

From these tests certain conclusions may be drawn:

- (a) Errors in determining lateral deviations will result from the practice of appointing unqualified officials, i.e. those who have had little experience and no test of their ability to spot. It is no refutation to reply that these officials are officers; experience has proved that the individual's education and intelligence has little to do with his ability to spot.
- (b) Since these errors will often be as large as $.50^\circ$ they will, in many instances, badly distort the relative positions of target and impact. We have often heard a battery commander exclaim after a practice: "That shot fell $.20^\circ$ left and it was recorded as right!" Errors in lateral deviation may very easily move the impact, as computed, off the broadside target.
- (c) Some lost shots are in reality hits for direction; and the battery may have to take the penalty for a "miss."
- (d) The odds are that the trained enlisted spotter will furnish more reliable data than the untrained officer.
- (e) Reasonably accurate angular measurements of lateral deviations can be assured with a small expenditure of time and effort.

I believe that a sand spotting range should be constructed in all harbor defenses and that no officer or enlisted man should be permitted to observe for target practice until he has been tested and found to be qualified. Battery commanders will welcome the added training burden in exchange for more reliable observing data.

Preparation of Antiaircraft Artillery Fire

BY MAJOR C. S. HARRIS, C.A.C.

IT is customary to preface any study on the preparation of antiaircraft fire with an emphatic statement on the importance of the subject. Also, there is a tendency to approach it with an effort to create something like a halo about trial-shot firings. Battery commanders are finding that some types of preparatory firing are of limited value; also they are experiencing some disappointment in the corrections from trial fire. This apparent conflict between theory and practice indicates that a study in the fundamentals of the subject is in order. Accordingly, an effort is made herein to stress the basic principles involved in the solution of each type of preparatory firing and to state their practical limitations.

In working out methods for the preparation of antiaircraft fire, Coast Artillery officers have very naturally adopted practices which were developed in seacoast experience, since the two problems have much in common. From a practical viewpoint there are some differences which have not yet been properly recognized. For example, the seacoast artillery battery commander is trained to consider his position-finding equipment more accurate than his guns and ammunition; consequently, in the preparation of fire he is much concerned with the accurate calibration of the guns of the battery. In antiaircraft artillery, the guns and ammunition are more accurate than the position-finding equipment; consequently, a small calibration difference between guns will help more often than it will hurt the fire. In seacoast artillery, where, during peace time training, only a limited amount of firing is conducted with any particular lot of ammunition, great importance is attached to the firing of trial shots and the determination of ballistic corrections immediately prior to each target practice. In antiaircraft artillery, where firings are frequently repeated with one lot of ammunition, it has been found that ordinarily the ballistic effects vary little from day to day and, consequently, the battery commander usually knows before trial fire approximately what ballistic corrections are required. A more difficult problem is to determine the correction required to compensate for error in altitude determination.

PREPARATION OF FIRE

The necessary steps in the preparation of fire are:

- (1) Test and adjustments of material.
- (2) Preparatory firings.

The first is the more important. Since the procedure in testing and adjusting the matériel varies considerably with different types, a complete discussion of this phase of the preparation cannot be fully covered in a short discussion. It is quite useless to proceed with the preparatory

firings until the test and adjustment of the fire control matériel has been made. The director should be tested for its accuracy in determining basic position-finding data such as angular height and azimuth. The Sperry director should be tested for accuracy in the determination of horizontal range and in the application of true parallax corrections. The director should also be tested for its accuracy in determining basic gunnery data, such as fuze setting, time of flight, and superelevation. The observing instruments to be used in the preparatory firings should be checked for accuracy. Careful orientation of the guns with the director is required. The accuracy of the quadrant used with each gun should be tested by sighting the gun and the director simultaneously on a celestial body and checking the gun quadrant reading against the angular height reading on the director. Thereafter the elevation dials can be adjusted rapidly by check against the quadrant. For each new battery position the guns should be oriented in azimuth with the director by boresighting on a celestial body or distant terrestrial object. At the same time a suitable aiming point should be registered for each gun in order that the orientation may be checked, even though celestial bodies are obscured by clouds. Tests are required for each fuze setter to determine the normal corrector setting. The check of the data transmission system completes the more important adjustments of fire control matériel. Detailed instructions for making adjustments are furnished with the equipment. Supplementing such instruction, each battery should have prepared a comprehensive plan of procedure for checking, adjusting, and synchronizing all of the equipment in use.

PREPARATORY FIRINGS

Types of preparatory firings employed are: calibration, trial, and verification fire. The method of procedure for the conduct of calibration fire is covered in C.A.F.M., Volume II. The purpose of such fire is to determine corrections, to make all of the guns in one battery shoot together or in a desired pattern. More specifically, this type of fire is for the purpose of determining a correction for each gun to correct for individual variations in muzzle velocity. However, the effect of a muzzle velocity variation is largely a matter of range deviation, and as previously stated, the guns are usually much more accurate in range than the position-finding equipment, therefore a small calibration difference between guns generally is beneficial. If the student of antiaircraft artillery will observe antiaircraft firing from a flank position, he will note that frequently the bursts are either all over or all short. The necessity for spreading in range the fire of the dif-

terent guns rather than bringing the fire of all guns together will be readily apparent. In other words, the depth of the battery beaten zone should be increased so that when fire is opened there may be a reasonable expectancy of bracketing the target. There is, of course, a practical limit to the spread between guns; the beaten zone of each gun should overlap with adjacent guns in order to avoid gaps in the pattern of fire. In this connection, let us digress long enough to state (perhaps to the surprise of many) that, in so far as dispersion is concerned, the operation of the powder train fuze is more satisfactory than the operation of the mechanical fuze, since the mechanical fuze does not give sufficient dispersion. The writer holds that there is rarely any occasion for calibration fire in antiaircraft artillery.

Verification fire has been used to check the results of orientation, calibration fire, and trial fire; more particularly the results of orientation. It consists of a few bursts from each gun, fired in salvos, at a burst, or at the sun, moon, or some other clearly visible object. Such firing may profitably be employed in a new battery before opening fire upon a towed target in order to give the personnel confidence. In a well-trained battery there is rarely any need for such fire. The fire control matériel can be properly adjusted without resorting to the expenditure of ammunition; when this is done "trial fire" is the only necessary type of preparatory firing.

TRIAL FIRE

The purpose of trial fire is to determine the corrections necessary for the prevailing non-standard ballistic conditions. If corrections are required because of basic errors in the fire control equipment, they should be determined in the adjustment of the matériel. Also, orientation errors should be eliminated by the mechanical adjustments. In paragraph 50 *c.* C.A.F.M., Volume II, it is stated: "The purpose of trial fire is to move the center of burst or pattern to the adjusting point." That, while true, is hardly a complete statement of the purpose. In order to fully visualize the purpose, it is necessary to understand what basic elements are affected, and what the principal causes of the effects are.

The basic elements of ballistic data in antiaircraft artillery are:

- Fuze setting,
- Time of flight,
- Superelevation,
- Drift, and
- Wind effects.

The first three factors above are of particular concern in trial fire. The effect of ballistic variations on drift is negligible. It will be shown later that wind effects are eliminated before arriving at the corrections from trial fire.

Data on these elements are extracted from the firing tables; these are based on certain standard ballistic conditions, and incorporated in the ballistic cams and charts of the director. In the director, the ballistic elements

(which are affected by variations in the ballistic conditions) are combined with position-finding elements, to obtain the firing data. The point can be illustrated by analyzing the elements of firing data. Take, for example, quadrant elevation. It may be broken down into the following components:

Present angular height—purely a position-finding element, which is not affected by ballistic conditions;

Vertical deflection—obtained by combining (1) the time of flight, which is affected by ballistic conditions, with (2) either the angular velocity or the linear velocity of the target, neither of which is affected by ballistic conditions;

Superelevation—a basic element of data, which is affected by ballistic conditions.

From such an analysis, if carried out for all the elements of the firing data, it can be seen that the director interprets the firing tables through the use of the basic elements of ballistic data. *Therefore, in trial fire we are primarily concerned in determining what corrections are required in order that there may be applied in the director, correct values of fuze setting, time of flight, and superelevation—values which coincide with the actual values under prevailing conditions.* The corrections to be applied should be selected with a view toward securing reasonably accurate values of these ballistic elements throughout the field of fire.

VARIATIONS IN BALLISTIC CONDITIONS

The principal variations in ballistic conditions, i.e., variations from conditions assumed to be standard, which are encountered in antiaircraft fire may be grouped as follows:

Group	Variations from standard conditions
A	Wind (still air is assumed in the preparation of the firing tables);
B	Variation in the rate of fuze burning;
C	(1) Variation in muzzle velocity;
	(2) Variation in atmospheric density.

GROUP "A"

WIND. For any given wind, the effects vary throughout the field of fire; consequently, it is impracticable to apply satisfactorily corrections for wind effects as determined from the results of a trial shot problem. If the trial shots were fired at zero azimuth, and a target were engaged at azimuth 180° , the wind corrections determined from the trial shots would apply in exactly the opposite direction to that required. Therefore, wind computing mechanisms, which determine and apply continuously the required wind corrections, are incorporated in the directors. Then, in order to avoid duplications in corrections, the wind effects on the trial shots are eliminated before the corrections from trial fire are determined. This may be accomplished, either by applying the wind corrections before firing, or by stripping the wind effects after firing. The main point is to obtain the same trial fire corrections as would naturally have been obtained had there been no wind. The present prescribed method is to

apply the wind corrections in the director before firing. The older method, that of stripping the wind effects after fire, is the more accurate. In the latest type of Sperry directors, where the wind corrections are applied through the operation of electrical "follow up motors," appreciable errors are frequently introduced. The resultant errors in the static trial shot problem give no indication that the same errors will hold during the fire for effect. Where accurate ballistic data are desired, emphasis should be placed on securing accurate wind messages and the wind stripping method should be followed. In the discussion hereafter, it will be assumed that the wind effects have been eliminated.

GROUP "B"

VARIATION IN RATE OF FUZE BURNING. Assuming that all other conditions are normal, then a variation from the normal rate of fuze burning will cause the burst to occur at some point along the normal trajectory other than the expected point. This is illustrated in Figure 1.

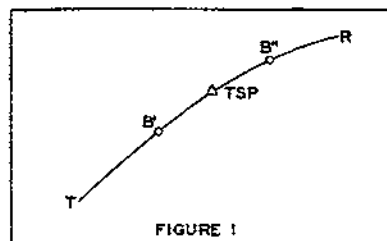


FIGURE 1

TR—Normal Trajectory
TSP—Expected point of burst
B—Point of burst of fast burning fuze.
B''—Point of burst of slow burning fuze.

light; that the superelevation actually required coincides with the expected superelevation, and, therefore, no correction is required in either the time of flight or the superelevation. However, if fire was opened without any correction, the burst might be expected to occur beyond the target, although the projectiles may have passed through the target. If a minus altitude correction was applied to make the range correct, it would operate to introduce an erroneous time of flight correction in the director with the result that the bursts would be behind the target. It is evident that a correction in fuze setting is desired, and it should affect only this setting. The correction should cause the fuze to burst in the normal time of flight, or for trial fire, at the TSP.

GROUP "C"

VARIATION IN THE MUZZLE VELOCITY. If it is assumed that all other conditions are normal, the point of burst for any given variation in muzzle velocity can be ascertained by referring to the firing tables. In Figure 2, TSP marks the expected position of the burst for the normal or assumed muzzle velocity. The point plus 100 marks the expected position of the burst for a muzzle velocity 100 feet per second greater than the assumed velocity.

The point minus 100 marks the expected position of the burst for a muzzle velocity 100 f.s. less than the assumed velocity. The data for each of the points is taken from the firing tables or computed therefrom. The differential effect line MV is drawn through the points —100, TSP, and +100. A clear understanding of the factors pertaining to this line furnishes the key to an understanding of the trial shot problem. For the particular fuze setting and quadrant elevation of the trial shot point, the firing tables indicate that the burst will occur at some

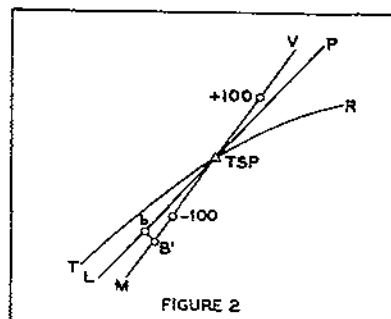


FIGURE 2

TR—Normal trajectory
TSP—Expected point of burst
LP—Line of position from the gun
MV—Differential effect line from muzzle velocity.
B'—Point of burst for low muzzle velocity.

change of range, since the line MV diverges only slightly from the line LP. If the reader will refer to the firing tables and look up the time of flight data for a given fuze setting and quadrant elevation and for two different muzzle velocities, he will see that the time of flight is the same in both cases, although the two points of burst are at different points along the line MV. The point is that for the fuze setting and quadrant elevation of the TSP the line MV is a constant time of flight line for varying muzzle velocities. The constant time of flight curve for varying elevations, as shown on trajectory charts, is, of course, an entirely different line. If in trial fire the burst occurs at a point on the MV line, it is an indication that the rate of fuze burning is normal and that the time of flight is equal to the expected time of flight to the TSP. If the burst occurs below the MV line, that is an indication that the rate of fuze burning is slow, and that the time of flight is greater than expected. If the burst occurs above the MV line, the indications are exactly the reverse. Many officers find it difficult either to understand or to believe the statements just made. They can be verified only by reference to, and confidence in, the firing tables. They should be clearly understood.

Assume that the burst center in trial fire is at the point B' (Fig. 2). Since this point is on the MV line it can be assumed that the actual time of flight is equal to the expected time of flight and that the rate of fuze burning is normal. In order to move the burst center to the TSP, it is necessary to increase both the fuze setting and the superelevation. It is evident, too, that when such corrections are applied and the burst made to occur at the

particular point along the differential effect line MV for any given muzzle velocity. For an increase in the muzzle velocity, the point will be further along the line toward V, and for a decrease in velocity the point will be closer in toward M.

Note that the effect of change in muzzle velocity is largely a matter of

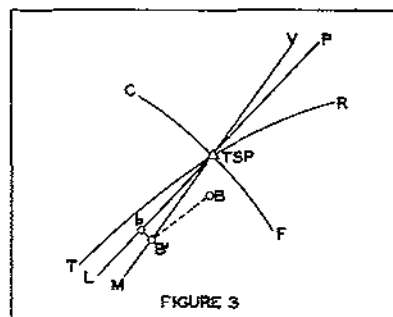
TSP the actual time of flight will then be greater than the actual time of flight to the point B', or greater than the expected time of flight to the TSP. Trial fire corrections are required, therefore, in fuze setting, super-elevation, and time of flight. When the so-called ballistic type of director is used, the corrections are applied by determining the indicated muzzle velocity and setting that value in the director. For other directors, the corrections are applied by making an altitude percentage correction. The proper procedure in the latter case is to move the burst center to the point "b" by means of a small elevation correction and from point "b" to the TSP by the altitude percentage correction. The value of the altitude percentage correction is equal to:

$$\frac{\text{Altitude of TSP minus altitude of point "b."}}{\text{Altitude of point "b."}}$$

VARIATION IN ATMOSPHERIC DENSITY. The effects due to a change in atmospheric density, follow very nearly the same laws as the effects due to a change in muzzle velocity. The differential effect line for atmospheric density actually plots between the MV line and the LP line (Figure 2.) The main point of difference is that the atmospheric density effects show up less noticeably on the early part of the trajectory. In trial fire, the practical solution is to correct for atmospheric density effects exactly as outlined above for muzzle velocity effects. If it is desired to determine the value of the muzzle velocity, the CB should first be referred to the MV line, and then stripped of the density effect by movement along the MV line. It is well to realize that the ballistic density furnished by the meteorological message is not entirely reliable, since it usually is based on surface readings only.

CORRECTIONS FOR COMBINATION EFFECTS

Let us now consider the situation where a combination of variations in ballistic conditions are encountered. Assume that the center of bursts in trial fire is at B. (Fig. 3). Since this is not on the MV line, its location indicates that there is a variation from the normal rate of fuze burning



TSP—Trial shot point
TR—Normal trajectory
CF—Fuze setting curve
LP—Line of position from the gun
MV—Differential effect line for muzzle velocity.

and that a correction in fuze setting alone is required to move the CB to the MV line. Since the CB is not on the normal trajectory, it is evident that one or both of the ballistic variations listed under Group C are effective and that corrections for those factors are also required. It may be assumed that the actual trajectory

is approximately parallel to the normal trajectory. The first step in determining the corrections is to refer the

CB to the MV line at B' by moving parallel to the normal trajectory and to measure the required fuze correction from B to B' in tenths of a fuze setting. The next step is to determine either the muzzle velocity correction, or the elevation and altitude percentage corrections required to move the CB from B' to the TSP as outlined above in the discussion on variation in muzzle velocity.

Thus we have arrived at the important corrections to be determined in trial fire. The first correction is in the fuze burning and should affect no other element of data; the second may be termed a range correction. Its necessity may be because of ballistic variations in either muzzle velocity or atmospheric density, or both; it may be applied by changing the muzzle velocity setting or by making an altitude correction coupled with a small elevation correction; in either case the range correction operates to apply corrections in the fuze setting, the super-elevation, and the time of flight.

The range correction can be given its proper value only when a high degree of accuracy is attained in altitude determination. Usually the range deviations due to altitude errors are greater, sometimes far greater, than are the range deviations due to the ballistic conditions. Obviously great stress should be laid on training the altimetric sections. The battery commander should make an altitude analysis of each day's fire. The altitude error on each course should be determined by a study of the flank range spots and by a comparison with the altitudes as determined by the record section. In this manner it is possible to determine if an altitude correction is needed to compensate for instrumental error. If so, such correction should be combined with the ballistic correction in altitude determined from trial fire.

CHANGES PROPOSED

The proposed method of determining the corrections from trial fire is essentially the same as that outlined in Section X, C.A.F.M., Volume II, except in the following respects:

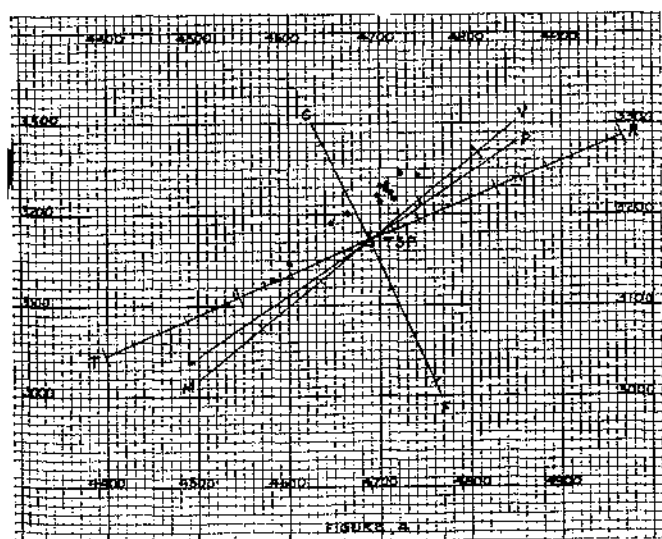
- (1) The location of the burst center is referred to the MV line by means of a fuze correction rather than by means of an elevation correction.
- (2) The altitude percentage correction is measured from a point on the line of position LP rather than from a point on the MV line.

FUZE CORRECTION VS. ELEVATION CORRECTION. The theory of the fuze correction as outlined is the same as that discussed in paragraph 68 of the F.M. No conflict in theory is involved. The possible necessity for a fuze correction was fully understood when the manual was prepared. However, proving ground fuze errors were small, and it was feared that battery commanders would make foolish fuze corrections as a result of errors either in gun laying or in burst observations; accordingly, a compromise solution was adopted. The elevation correction was prescribed for trial fire; the determination of the

fuze error and the muzzle velocity was ruled out until after a series of trial shot problems were fired. Unfortunately, to support this solution an erroneous statement was injected in paragraph 51 of the text to the effect that a fuze correction would destroy the accuracy of the basic data. As a result only a very few battery commanders attempt to determine their fuze error, notwithstanding the facts that such errors do occur. The first disadvantage then is that the fuze error, if detected at all, is discovered only after the allowance of ammunition is expended. The second disadvantage is that the prescribed method of procedure leads to erratic trial fire. Battery commanders lean too heavily on trial fire to detect errors in elevation, orientation, wind, parallax, and data transmission. They permit trial fire to degenerate into the category of burst firings. If ballistic information is desired, the above factors should be eliminated, otherwise the trial fire is worthless. Care should be exercised to secure accuracy in fuze setting, gun laying, burst observation and correction for wind effects.

Experience has shown that the fuze error can be measured accurately from one trial shot problem, also that it can be determined more satisfactorily from one accurate problem than from any number of erratic firings.

Figure 4 shows the results of the trial shot firings by



four batteries of the 64th Coast Artillery during March and April, 1936 with 3-inch AA Guns, M3, and ammunition Lot No. 1354-1. Each problem was fired with a quadrant elevation of 700 mils; fuze setting 13. The wind effects were stripped after firing. Each point represents a corrected burst center. The ammunition was in excellent condition; average weight of projectile, 15 pounds, 4.5 ounces. The average ballistic atmospheric density was 0.86. It will be noted that the burst centers fall along a line roughly parallel to the differential effect line with a consistent fuze error of about four-tenths of a fuze setting. It will also be noted that a considerable dispersion in range was obtained. This was accounted for

in part by corresponding variations in the density due to low atmospheric pressure. The average muzzle velocity was 2,600 f.s. Trial shot problems fired at an elevation of 500 mils, fuze 13, also showed the same values both for fuze error and muzzle velocity.

MEASUREMENT OF THE ALTITUDE CORRECTION. The proposed change in the method of measuring the altitude percentage correction is dictated by recent developments in director design. Referring to Figure 3, it is evident that the correction should be measured from point "b" rather than from B', since an altitude correction will move the burst center along the line LP and not along MV. For the method now prescribed the point B' was selected both for uniformity and simplicity. The error thus introduced was considered negligible since it was contemplated that muzzle velocity corrections would be utilized. The situation has since changed; the latest type of directors do not provide for any muzzle velocity corrections. Consequently, it will eventually become necessary to apply altitude corrections for large variations in muzzle velocity and an analysis has shown that such procedure is practicable if the more accurate method, as recommended herein, is followed.

CHANGES IN PROCEDURE

OBSERVATION INSTRUMENTS. In the prescribed method, it is contemplated that two B.C. Telescopes, M1, will be used, one at each observing station. These instruments are equipped with an inexpensive, low powered, panoramic telescope, and a high powered telescope with graduated mil scales. According to the prescribed procedure the instrument is pointed at the TSP and the deviations of the burst are read on the deflection scales. The main disadvantage of this method is experienced at the O₂ station; the bursts occasionally occur outside the small field of view of the high powered telescope and are lost. Aside from the waste in ammunition, this method results in the location of a false CB, since only those bursts which occur in a limited area are observed. Fortunately, the low powered panoramic telescope with its larger field of view provides a more satisfactory observing instrument. The instrument is pointed on the TSP; when the burst occurs it is quickly centered and the azimuth and angular height of the burst are read. From these readings the azimuth and angular height deviations are computed, thereby eliminating the problem of computing azimuth deviations from the deviations in the inclined plane. If the director is located near the gun it should be used as the O₁ instrument, since it is more accurate than the B.C. Telescope—M1.

GRAPHICAL TRIAL SHOT. For the purpose of determining the trial fire corrections (after the CB is located) the graphical trial shot chart is recommended rather than the Lewis Charts with the differential scales. The Lewis Charts offer well recognized advantages in the preparation of trial fire data and in the determination of the burst center location. Indeed, the principle which

Major Lewis developed constitutes a brilliant contribution to artillery fire control, with great possibilities of wider application. However, for the purpose of determining the trial fire corrections the use of the Lewis Charts presents the distinct disadvantage of not being able to visualize easily the necessary steps. The result is that the solutions are now being made in a rule of thumb manner without due regard to the ballistic results. On the contrary, the trial shot chart (Figure 5) enables the officer to visualize clearly what results have been obtained and what corrections he should make. It is universal in application and it can be made locally. Its usage is discussed in detail in the next section.

PROCEDURE

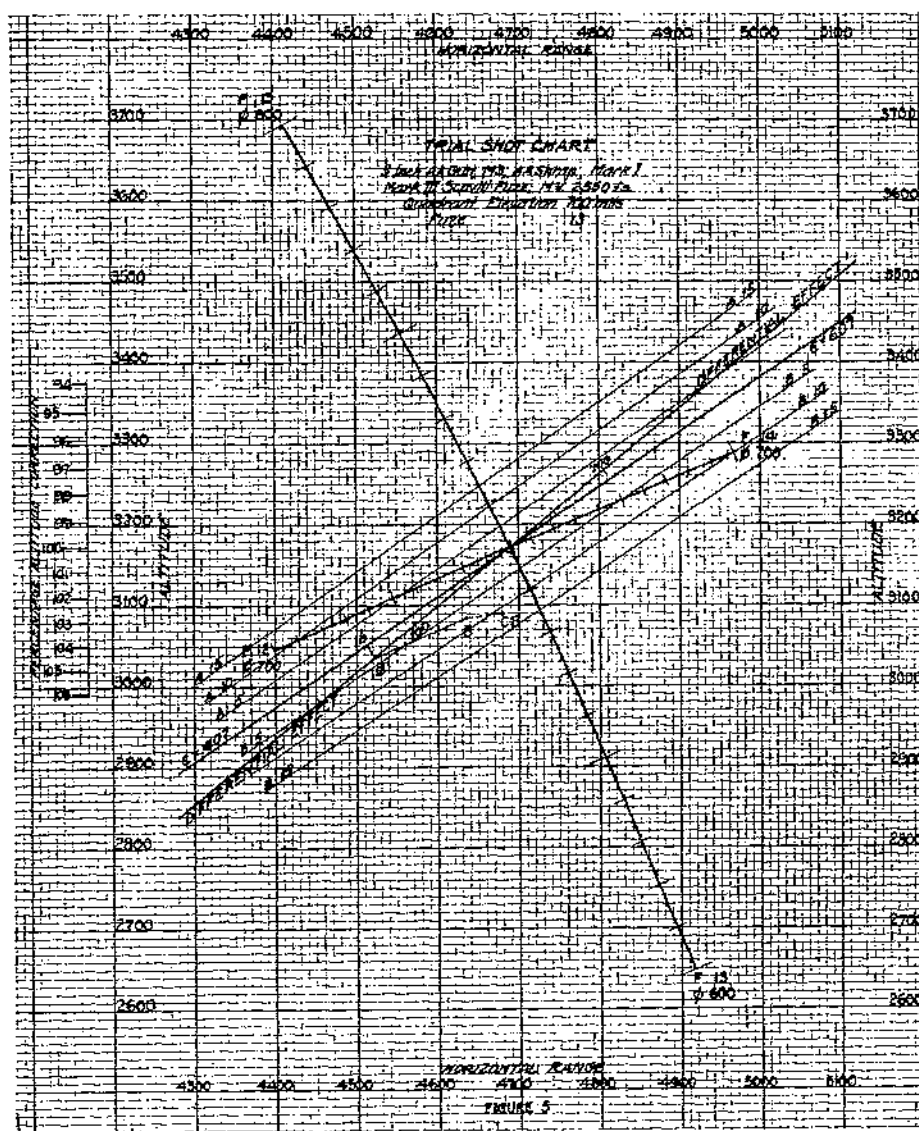
SELECTION OF THE TSP. The trial shot point should be selected at a range and altitude at which it is expected to execute the most effective fire. It is usually selected at the intersection of one of the 100 mil trajectories and one of the fuze curves. The fuze setting should be 12 or more, since at shorter ranges the ballistic effects are small, consequently a small observation error at short ranges leads

to a material error in the corrections. Since it is necessary to prepare trial shot charts for each trial shot point, the practical solution is to use only a few points, for example:

Altitude	Fuze	Quadrant Elevation
Medium	13	700 mils
High	14	1,000 mils
Low	13	500 mils.

Each trial shot point is applicable at any desired azimuth. A convenient azimuth is chosen to provide good intersection at the TSP from the selected O_1 and O_2 stations. The trial shot chart must be prepared for the muzzle velocity which agrees with that used in the ballistic cams or charts in the director.

THE FIRING DATA. Since the wind effects are to be stripped after firing, the trial shots are fired at the quadrant elevation and fuze setting for the selected trial shot point and at the selected azimuth. The actual setting of each fuze and the azimuth and elevation of the gun should be checked for each shot. Succeeding rounds are fired as rapidly as is consistent with accuracy in laying the gun and observing the bursts.



LOCATION OF THE BURST CENTER.

The O_1 and O_2 stations should be intervisible, if practicable, in order to simplify orientation. Normally the B.C. Telescope, M1, is used at the O_2 station and the director at the O_1 station. The instruments are leveled, oriented, and pointed at the TSP. For each burst they are quickly centered on the burst and the azimuth and angular height readings made. When all of the rounds have been fired the averages of the azimuth readings are computed for both stations and the average vertical deviation for O_1 .

The azimuth deviations are then applied on the Lewis Charts to obtain the horizontal range of the CB. This range and the vertical deviation from the O_1 station are then applied on the graphical trial shot chart (Figure 5) to determine the actual CB.

DETERMINATION OF TRIAL FIRE CORRECTIONS. The trial shot chart is prepared from data contained in Firing Tables 3 AA-J-2; to a scale of 1 inch equals 100 yards. It is intended for use only when the ballistic cams or charts in the director are designed for a muzzle velocity of 2,550 f.s. The wind effects are stripped to locate the corrected CB and the trial fire cor-

rections are determined in the manner illustrated in the following example. The trial shot data:

Elevation	700 mils
Fuze	13 mils
Azimuth	1,000 mils
Ballistic wind,	
(a) Azimuth	3,600 mils
(b) Velocity	15 m. p. h.

From observation and the Lewis Chart the location of the burst center is determined to be:

Vertical deviation	Low 11 mils
Lateral deviation	Left 1 mil
Horizontal range	4680 yards

This is marked CB in Figure 5.

The wind azimuth is 2,600 mils clockwise from the plane of fire. From the wind stripping chart it can be determined that the wind component effects are:

Deflection,	Left 5 mils
Horizontal range,	Plus 45 yards
Altitude,	Plus 7 yards

The wind effects are stripped by moving the burst center in the opposite direction to indicate where it would have fallen had there been no wind effect. The corrected location, indicated by point B in Figure 5, is found to be as follows:

Lateral deviation	Right 4 mils
Horizontal range	4,635 yards
Altitude	3,083 yards

In determining the corrected CB, it is advisable to make corrections for parallax between the O₁ station and the gun, if there is any appreciable displacement. In this problem the parallax is assumed to be negligible.

The trial fire corrections are measured from the corrected burst center B.

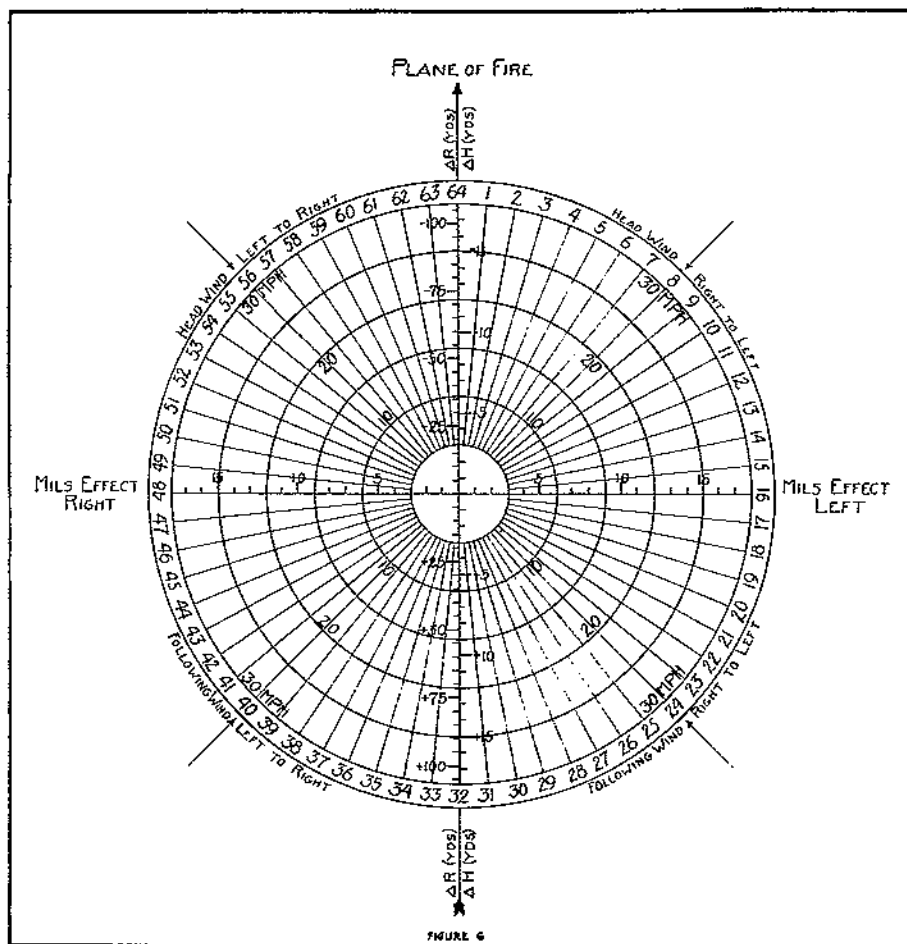
FUZE CORRECTION. Draw a line parallel with the normal trajectory through B to the differential effect line and mark the intersection B' (Figure 5). Measure the distance from B to B' in tenths of a fuze setting by means of the scale on the normal trajectory. In this case the desired fuze correction is —.4 and the actual fuze setting should be reduced by this amount; preferably on the director fuze spot dial. It may be applied by changing the corrector settings on each of the fuze setters.

RANGE CORRECTION. The next step in the procedure is to determine the correction required to move the CB from point B' on the

differential effect line to the TSP. This will correct for any variations in muzzle velocity or atmospheric density. Either a muzzle velocity correction or an altitude percentage correction may be applied, depending upon the type of director.

MUZZLE VELOCITY CORRECTION. The muzzle velocity correction can be utilized only on directors which provide for a muzzle velocity setting. The correction is determined by reading at B' the indicated muzzle velocity. In the example the correction is minus 145 f.s. The assumed muzzle velocity was 2,550 f.s., therefore the correct velocity will be 2,405 f.s. By applying this in the director, the CB is moved from B' to TSP.

ALTITUDE CORRECTION. When it is necessary to apply an altitude correction rather than a muzzle velocity correction, a small elevation correction should first be made in order to move the CB from B' to the line of position. Draw a line parallel to the normal fuze setting curve from B' to the line of position and mark the point of intersection "b." Measure the correction by means of the scale on the fuze setting curve. The correction in the example is plus 3 mils; this is applied on the director vertical spot dial. The altitude percentage correction is measured from the point "b" to the TSP. This percentage may be computed arithmetically; however, for convenience a scale for this purpose will be found at the left



Antiaircraft Wind Stripping Chart TSP No. 1.

margin of the trial shot chart. The value of the correction is read by following a horizontal line from "b" to the altitude percentage scale. The correction in this example is plus 4% or a total of 104%. If the altimeter is used, the correction is applied thereon. If the heightfinder is used, the correction is usually applied on the director. In the latter case, an effort should be made to determine, from the results of previous firings, the average instrumental error and to compute a total altitude correction to compensate for both factors.

LATERAL CORRECTION. Since the lateral deviation of the corrected CB was right 4 mils, the usual procedure is to apply a lateral correction of left 4 mils on the director. The better practice is to find the cause for a lateral deviation and to correct the error at its source. This deviation is rarely due to systematic ballistic variation; usually it will be due to some one or a combination of the following:

- Error in orientation.
- Parallax.
- Unknown wind effects.
- Error in drift correction.

If the deviation is due to an error in orientation between the O_1 instrument and the gun used for trial fire, it does not necessarily follow that there is a similar error between the director and all guns. The orientation should be accurate. The same analogy can be made for parallax. If the deviation is due to unknown wind effects,

the correction will serve to improve the fire for effect only when in the same direction as that of the trial fire.

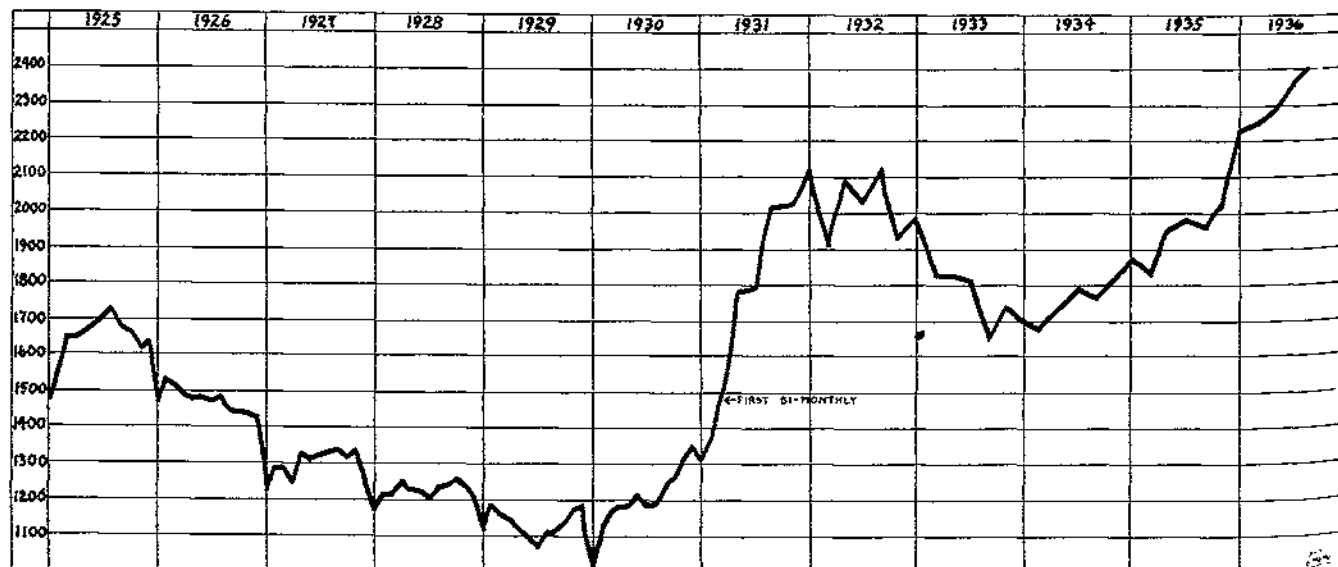
Neither the lateral nor the elevation correction mean very much, since they may be changed by adjustment corrections when fire for effect is opened.

SUMMARY

In the preparation of antiaircraft fire, the careful adjustment of the fire control equipment is of paramount importance. Calibration and verification firing have little usefulness. Trial fire should be conducted, but daily repetition of this is not necessary. The two important corrections, to be determined in trial fire, are the fuze and the range corrections. The former should be made with great care; the latter may be made either as a muzzle velocity correction or as an altitude percentage correction; it can derive its full value only when altitude determination is consistent. The elevation and lateral corrections are of little consequence. Under the present status of development in fire control equipment the accuracy of antiaircraft fire depends largely upon the accuracy of range determination, and this, in the final analysis, now depends upon the accuracy in altitude determination. Since the gun and ammunition are more accurate in range than the position-finding equipment, it will usually be found advantageous to create artificial dispersion in range when more than two guns are fired. This can be accomplished satisfactorily by applying a systematic adjustment in the corrector on the fuze setters.



The Coast Artillery Journal Life Line—Watch it Grow!



One Thousand Reserve Lieutenants for One Year

By LIEUTENANT COLONEL F. S. CLARK, C.A.C.

THE inauguration of the policy of inducting into the Regular Army 1,000 Reserve lieutenants for one year's active duty training, introduces some genuinely new problems. Neither the methods of training hitherto prescribed for Reserve officers nor the methods of handling recent graduates of the Military Academy will meet the situation without modification. Furthermore, the problem is presented of affording an equal opportunity to the Reserve lieutenants within each arm to compete for the limited number of permanent appointments to be made in the Regular Army.

For some time there has been definite planning in the Harbor Defenses of Chesapeake Bay in preparation for the training of the twenty-three Reserve lieutenants who will be assigned to this command. This planning has been guided by the experience obtained in handling the basic training of second lieutenants of the 1935 West Point class. Based on this, the following notes may be of value to others to whom will fall the responsibility of conducting similar training.

It is to be remembered that these young officers are graduates of the R.O.T.C., therefore they already possess a good foundation in the technique and minor tactics of the arm with which they are to serve. They will not start from the depths of abysmal ignorance; they will be ready for immediate work, and will possess an intelligent conception of the problem in its broader aspects.

The next thing to remember is that these young men have arrived at a time in their careers where the primary need for the development of their characters as men and officers is the opportunity to accept and demonstrate responsibility. In the great majority of cases the experience of these men has been limited to college requirements. This means that they have learned to follow a program which someone else prescribed; that the measure of their achievement has been the ability to produce academic solutions; that the extent to which they have learned to cooperate with equals and superiors, or to control subordinates, has been incidental, accidental, and extra-curricular. What these young men need, and what the Reserve Corps and Regular Army needs of them, is that they be "put on their own." They must be taught by practical experience that the standard of military efficiency is not academic versatility and complaisance, but the work-a-day talent to get things done.

It is apparent that the War Department entertains a similar point of view, for instructions have been issued which will distribute the Reserve lieutenants to troop units in the ratio of not more than three per organization.

A distribution on this basis means that for each officer there can be a real job, both tactical and administrative, with his unit.

Some of the details by which this practical training will be made effective at this post may be of interest.

Upon arrival, each lieutenant will be assigned to a battery, and will be informed that the men of the battery, its work and matériel, are the foci of his interest and responsibility, and that the battery commander is the person under whose watchful eyes he will be working. The battery commander will be assured that except during the hours prescribed for classroom work and for tactical and administrative assignments within the battery, there will be no restrictions on his control and use of these officers.

The Director of Training will prepare two schedules: (a) *tactical* assignments, such as battery executive, range officer, and casemate officer; and (b) *administrative* assignments, including mess officer, supply officer, and administrative officer. During the year, these assignments will be changed at least twice, so that each lieutenant will have had actual experience as mess officer, supply officer, and battery executive. A similar plan was carried out with the 1935 graduates of the Military Academy. Emphasis was laid on the requirement that the detailed work of each assignment should be done by the officer; notwithstanding the occasional manifestation by first sergeants or mess sergeants of the attitude that it would be easier to do the work themselves than to hover around while a lieutenant did it. The competence and readiness to assume responsibility developed by the officers who started life under this régime has already paid dividends, and justifies its extension to the Reserve lieutenants.

Inasmuch as the responsibilities delegated to the Officer of the Day at Fort Monroe are somewhat complicated and comprehensive, these lieutenants will not immediately be placed on the O.D. roster; they will be required to serve several tours as Officer of the Guard, in order that they may learn the local intricacies of guard duty before being launched into the full responsibility of the Officer of the Day. As early as practicable they will be instructed by means of informal talks on such subjects as:

- (a) The plan that will be followed in carrying out their training and schooling.
- (b) Professional and social relations between officers.
- (c) Relations between officers and soldiers.
- (d) Necessity for adherence to inflexible standards of honor, integrity, industry, and courtesy.
- (e) Personal finances and frugality.

From time to time, as occasion demands, the Director of Training will impart other suggestions, advice, and admonitions, either individually or collectively.

In addition to his own observation, the Director will keep in touch with the progress of his charges, by the informal reports made to him by all battery commanders, and by the senior officers on the post.

An important element in building up the loyalty, contentment, and understanding of this or any other group of newly commissioned officers, is to incorporate them quickly, naturally and fully into the social life of the garrison. To this end it is hoped that officers and their families will, on all appropriate occasions, include these young officers in their social gatherings. The underlying idea is that their social life should be merged unostentatiously into the social life of the garrison, and not left to develop as a "herding" among themselves.

Each Reserve lieutenant will be required to keep a notebook, consisting of three parts. The first section will be a log in which will be entered, in the briefest possible manner, the duties performed each day, drills attended, and new professional experiences.

The second section will be devoted to formal classroom instruction, and will include such subjects as lesson assignments, notes based on lectures and conferences, and problems solved.

The third section will include ideas and references embodying the impressions and experiences of sufficient importance to be worth preserving. It is expected that the Director of Training frequently will be surprised, perhaps amused, by the items which find their way into this part of the notebook. In particular he may expect to find that circumstances which are commonplaces to an older

officer appear as significant discoveries to those just entering the military service. Regardless of its ultimate value to the young officer, this section will provide the Director of Training with a valuable means of appraising the progress, mental alertness, accuracy of observation, and common sense of the author.

These notebooks will be turned in periodically to the Director of Training for review and grading.

Up to this point little has been said of the formal classroom instruction, an essential feature of the year's training. The reason for this is that the major emphasis should be laid on performance of troop duty; also, at the date of this writing, the War Department has not prescribed the scope and methods for this instruction, except that it will cover 300 hours (75 hours of subjects common to all branches and 225 hours of subjects prescribed for each branch); and that each subject will be concluded by an examination, prepared and sent out by the War Department, and graded by a central agency.

It is hoped that the directive will permit a ten hours per week schedule so that the course may be completed in thirty weeks; and that the beginning of classroom work may be deferred until after the summer training season. Classroom instruction should not be permitted to interfere with full-time participation in the summer training activities. The full measure of value to the Army, the Reserve Corps, and the young men themselves, will be achieved if they are completely amalgamated in the garrisons to which they are assigned; if troop duty, real work, and personal initiative are stressed, and if they are kept under the watchful and sympathetic supervision of an experienced officer.

Peace At Last

*When banks are deemed secure without strong vaults
And cities are thought safe without police;
When human nature sublimates its faults
And warring creeds indite a pact of peace:
When cacti, briars, and thistles lose their thorns,
The snake its venom, and the bee its sting;
When wild boar shed their tusks, the bull his horns,
And everything loves every other thing:
When wolves become like gentle lambs at play
And hawks and eagles are as ducks and geese;
When the catamount and other beasts of prey
Spare flock and herd: then man may look for peace!*

From *Where Cross the Crowded Ways*
By Major N. A. Jones, U. S. Army
Dorrance & Co., Phila., Pa.

Organization of AA Regiment

By MAJOR WILLARD IRVINE, C.A.C.

IN the preceding articles of this series, the organization of antiaircraft artillery has been considered primarily from the viewpoint of the minimum number of guns, searchlights and machine guns required to defend a small objective against attack from the air. In this article, the principal points discussed are:

- (1) Should the battalion, the regiment, or the brigade be the smallest self-contained tactical unit?
- (2) Should the organization of antiaircraft artillery be based on the requirements for the defense of field forces or rear area bombardment objectives?
- (3) Should any changes be made in types of armament?

THE SMALLEST SELF-CONTAINED TACTICAL UNIT

Antiaircraft guns, searchlights, and machine guns may be combined into a battalion, a regiment, or a brigade, to form a self-contained tactical team. The present organization of antiaircraft artillery follows a middle of the road policy with the regiment as the smallest unit combining all weapons in sufficient numbers to establish an all-around defense.

Those who favor a composite battalion of guns, searchlights and machine guns include many who have served in Panama where a special situation is encountered. They would replace the present regiment, consisting of a battalion of guns and searchlights and a battalion of machine guns, with a regiment of three composite battalions, each intended for the defense of a 120° sector. Numerous proposals have been made for the organization of these composite battalions, the principal ones being:

- (1) Hq.-Hq. Battery and Combat Train
 - 1 Gun Battery (6 guns of 3 fire units)
 - 1 Searchlight Battery (12-15 lights)
 - 4 Machine Gun Batteries (12 machine guns each)
- (2) Hq.-Hq. Battery and Combat Train
 - 2 Gun Batteries (6 guns of 2 fire units per battery)
 - 1 Searchlight Battery (15 lights)
 - 2 Machine Gun Batteries (16 machine guns each)
- (3) Hq.-Hq. Battery and Combat Train
 - 1 Gun Battery (6 guns and 6 lights)
 - 2 Machine Gun Batteries (18 machine guns each)
 - 1 Machine Gun Battery (12 machine guns—2 per light)

TOTAL FOR REGIMENT

	(1)	(2)	(3)
Guns	18	36	18
Searchlights	36-45	45	18
Machine Guns	144	96	144

Some of the reasons for changing to this type of organization are:

(1) The present command set-up, with a gun commander, a machine gun commander, a searchlight commander, as well as a regimental commander—all functioning over 360°, requires an excessive amount of tele-

phone wire for the communications system. This would be materially reduced with a single commander for each sector.

(2) A regiment of three composite battalions best lends itself to employment as an organic part of a corps of three divisions.

Apparently, a smaller number of officers would change to a homogeneous regiment of guns, searchlights, and machine guns. They consider the brigade the smallest unit suitable for the defense of a corps or a typical rear area objective; and they believe that the gun defense, the searchlight defense, and the machine gun defense are distinct, and can be best coordinated by a single commander of each for the area defended.

Between the two, i.e., a regiment of composite battalions and a homogeneous regiment, stands the present antiaircraft artillery regimental organization. Clearly deficient in power for the defense of either a corps or an important bombardment objective, its weapons could, however, be doubled, and yet manned by fewer personnel than an infantry regiment. The present regimental organization has not been sufficiently tested in field exercises, nor are reasons obvious to warrant a change to a homogeneous regiment. A practical field test designed especially to compare the advantages of the composite battalion organization would be valuable.

This wide variation in opinions of Coast Artillery officers as to the best organization of an antiaircraft artillery regiment is due, in part, to their limited experience in the tactical employment of this new arm. The fairly complete regiments at foreign stations each have a special problem, and are not available for experimental exercises. The one peace-strength regiment and the three composite battalions, scattered over the United States to aid in the training of the civilian components of the Army, would have to be combined to form a suitable war-strength regiment for tactical exercises. (How fortunate is the Infantry in having always available at their service school a war-strength regiment of over 2,000 men). Joint tactical exercises with the Air Corps on a scale large enough to justify drawing valid conclusions take place about once a decade.

Moreover, no agency charged with the development of antiaircraft artillery tactics has adequate personnel to perform this duty. The small group of officers forming the Coast Artillery Board is, of necessity, mainly concerned with technical developments, which properly have priority over tactical. Again, the one instructor in antiaircraft artillery tactics at the Coast Artillery School is so heavily loaded with classroom work that he can devote little time to tactical research.

DEFENSE OF FIELD FORCES AND REAR AREA BOMBARDMENT OBJECTIVES

Antiaircraft artillery is used to protect field forces and important targets in the theater of operations and the zone of the interior. A field army contains organically six antiaircraft artillery regiments: three to the army and one for each of its three corps. Still other regiments are assigned to GHQ to reinforce the armies. Protection is also given to vital installations in the communication zone; furthermore, antiaircraft artillery is required to cover industrial and military establishments and critical points on essential lines of communication in the zone of the interior. *The need of antiaircraft artillery for the zone of the interior has greatly increased since modern bombers can reach deep into the heart of a country.*¹

For the first year of any defensive war in which this country might be engaged, it is probable that little, if any, antiaircraft artillery could be assigned to field forces. The limited number of weapons available initially, and all that could be produced for some time after the beginning of a war, would be required by the GHQ Air Force, the communication zone, and the zone of the interior. The policy for the assignment of antiaircraft artillery might be determined by listing probable objectives for enemy air attack in the order of their military value, giving weight to accessibility. This assignment should take into consideration the necessity for a strong ground defense against attack from the air. This would result in the defense only of objectives highly vulnerable to aerial attack and those of great military importance. As a general rule each of these major objectives will require a brigade to provide adequate antiaircraft artillery protection.

Inasmuch as antiaircraft artillery was developed during the World War, its organization, as adopted shortly thereafter, was greatly influenced by the requirements for the defense of field forces. Mobility was a prime essential. Antiaircraft artillery was designed to move at a high speed and go in and out of position quickly. Now, bombardment aviation is less concerned with field forces (which are seldom good targets), and is seeking critical and highly vulnerable areas, generally found outside the combat zone. This development indicates a reduction in the amount of transportation in the regiment and an increase in the amount of armament.

To meet the requirement of mobility in the combat zone, the regiment has 177 pieces of motor transportation, including about 100 trucks. Some trucks of special design cost as much as \$8,000. Since it is probable that the bulk of the antiaircraft artillery will be used in the communication zone and the zone of the interior, where changes of objectives are infrequent and motor pools are available when movement is required, economy dictates many regiments, each with reduced transportation. No

longer need range, volume of burst, and stability of mount be sacrificed for mobility.

The effect of the two forms of antiaircraft artillery defense on organization may be summarized thus: *If the requirements for the defense of rear area bombardment objectives are predominant in determining the type and amount of armament, and the requirements for field forces primarily determine the form of organization, a regiment suitable for all missions will probably result.*

CHANGES IN ARMAMENT

A change in armament which may be considered is the use of the 105-mm. antiaircraft gun in mobile regiments. This gun has a vertical range of 37,000 feet as compared to 28,000 feet for the 3-inch gun. The maximum effective bombing range is unknown, but the ceiling of modern bombers exceeds 20,000 feet and is increasing. Although favorable weather conditions for bombing at an altitude of over 12,000 feet is the exception we must be prepared to meet bombing attacks from an altitude of 20,000 feet. The 105-mm. antiaircraft gun is now employed only on fixed mounts, but it could be made sufficiently mobile for field use.² Limited tests indicate that it has approximately the same accuracy as the 3-inch gun, but its greater bursting charge and range may prove it to be more effective against bombers flying near their ceiling. However, with the serious disadvantage of a rate of fire of one-half the 3-inch gun, a much greater cost, and a slower production rate in the event of war, the employment of the 105-mm. gun in mobile regiments does not, at this time, appear to be justified.

Machine guns—the weapons used against low-flying aviation—are effective if hits are obtained on the pilot, the gas tank, or the engine. Because of an unsatisfactory fire control system, the number of hits to be expected at long range has been discouraging. For two years the Coast Artillery Board has conducted tests to solve this problem. The final results may determine whether the caliber .50 machine gun, either as a single or multiple mount, should be retained, or whether a small caliber gun with an explosive projectile, such as the 37-mm. gun, should be substituted.

CONCLUSION

Competent authority has stated that our antiaircraft artillery equipment is the best in the world. The organization of this equipment is subject to improvement. Changes in organization should be based on further study of the two types of antiaircraft artillery defense and practical field exercises with at least a complete regiment. The best arrangement for testing the tactical organization would be to station a full-strength regiment at or near a large Air Corps field and the carrying on of continuous joint training by the two arms.

¹The fuel capacity of the new Boeing bomber exceeds 2,000 miles.

²In the Navy, where mobility is not a factor, a 5-inch antiaircraft gun is used.

General Douhet's Doctrine of War

As reviewed by LIEUTENANT COLONEL L. G. ROUSSEAU, French Army

Translated by LIEUTENANT COLONEL CAMILLE MAZEAU, C.A.-Res.

MORE than ten years have elapsed since there appeared in Italy the first writings of General Douhet, advancing a new doctrine of war. These theories, new and bold, for which Douhet had struggled and suffered, were opposed in the land where they first came to light. To a limited extent they seem to have been applied to the military organization of the Italian Army.

In France, Douhet's ideas have been variously received, but with the exception of a few press articles, no critical study has been made outside of the relatively small circle of military reviews.

Almost simultaneously two books have recently appeared: *Air Power versus Land Forces*, by General Allehant, and *General Douhet's Doctrine of War*, by Colonel Vauthier. These consider Douhet's ideas on the conduct of war. Marshal Petain, in his preface to the second book, emphasizes their value and praises "the man who tomorrow may be considered as a precursor."

The first of these books is, in its opening pages, a refutation of the basic principles advanced by Douhet. The second book, drawing from the somewhat scattered writing of Douhet, reconstructs the doctrines and for the first time presents them assembled and coordinated, and subjects them to a critical examination.

The bases of Douhet's thesis is that, in war, the maximum efficiency must be sought in the totality of the armed forces; land, sea and air. On land and sea the defensive is easy; the offensive difficult and costly. Every increase in the power of the armament accentuates the character of each of these. In the air the defensive attitude is impossible; the offensive is facilitated by the impossibility of effective defense. The instruments of chemical warfare, which will be employed without restriction, give to the aerial offense so much power that it will bring a quick decision.

Victory will result from assuming the offensive in the air and the defensive on land and sea. Consequently the minimum of a nation's resources should be employed for land and sea armaments and the maximum for aerial armament.

Douhet's doctrine is summarized in the following formula: "Resist on the surface and attack in the air."

The putting into effect of this idea evokes two fundamental principles:

1. To attack with the major part of one's forces in the air.
2. To assure the inviolability of the national territory by defensive measures on land and sea and against aerial attack leaving to the aerial army the time to impose the decision.

From these principles, Douhet, with a rigorous logic, draws his conclusions without deviating from the classic

rules of the conduct of war. His application of the principle of the "economy of forces" demands that not one single airplane shall be detailed from the aerial squadrons for any secondary mission. Thus auxiliary aviation of the army and navy and pursuit aviation whose mission is "to defend," will be eliminated. Only a limited amount of reconnaissance aviation should be retained.

Towards the end of his life Douhet had clarified his ideas on auxiliary aviation. He remained inflexible in the theory that not a single airplane should be detailed from the aerial army. If, at the beginning of hostilities, the army and navy could not dispense with auxiliary aviation, they should procure this from their own budget.

The essential mission of the air army is the destruction, on the ground, of the enemy aviation, matériel, installation, facilities, and production plants. Thus the mastery of the air will be obtained, and continuing destruction of other vital sinews of war will compel the enemy to surrender.

No time should be wasted to seek contact with enemy aviation, which will always be able to refuse to fight; however, if the air army is attacked, it should accept combat. This theory calls for the battle airplane, the only type Douhet would have in the air army with the single exception of reconnaissance planes of a much lighter type. The battle plane will be very large; heavily armed with from 16 to 20 machine guns and one or two 37-mm. guns. The vital parts will be armored. These battle planes shall fly in formation as squadrons, mutually flanking each other.

At the beginning of the action, incursion of enemy aviation may be expected, and proper protective action against these should be undertaken.

For active ground defense both guns and machine guns will be used. Douhet does not put much reliance in these because there will never be matériel enough to defend effectively all sensitive points. Therefore it is to passive defense of all kinds that the main effort must be directed. Above all the civil population must be educated to strengthen its morale.

Unity of purpose, so necessary in war, requires one single ministry or department, exercising its authority over land, sea and air forces and the aerial defense, of the national territory. In time of war there should be one commanding officer of the armed forces and one commanding officer of the air defense, functioning under the authority of the minister for national defense.

The land forces, the navy and the air defense will have to learn how to do without aviation, but the support of the air army should be assured to them as soon as it has acquired the mastery of the air.

Competent general staffs will have to be trained in matters pertaining to the three armed forces.

All of these conclusions are worth what the premises are worth, and it is upon these that the discussion, to have any value, must be based.

The first point, or premise, which Colonel Vauthier does not fail to note, is that: "the doctrine of Douhet was established only for Italy. From this Douhet never departed. Even when he speaks of war in general, he always envisages the particular conditions of his own country." It is on these particular conditions that Douhet has based his theories for security.

Italy's land frontiers consist of high mountains easily defended. These mountains constitute an almost impassible obstacle for a major offensive, only the passes being vulnerable. The defense of the boundaries would protect the valley of the Po which includes all the industrial resources of the country.

Due to the absence of naval bases, and lacking sufficient capital ships, the Italian navy cannot dream of domination. Douhet limits his naval operations to denying to any other nation mastery of the Mediterranean.

Douhet's scheme appears to be fairly well adapted to the conditions which he visualizes. The extension of his doctrine to other countries is a generalization which he never made.

When Douhet's doctrine is applied to theatres of operations such as ours, one objection is immediately encountered; does the land defense furnish security in the sense that Douhet would give the word? The progress of armaments, contrary to what Douhet held, is not to the disadvantage of the offensive. Troops poorly equipped with the means to take the offensive, if deprived of all auxiliary aviation, will certainly yield to the shock of a mechanized army, such as we see coming into being at the present time. Would not the sudden attack of such an army overwhelm the forward covering forces before they were fully installed, thus obtaining results as quickly as the aerial attack, with the additional advantage of the occupation of the ground? Colonel Vauthier admits this and General Allehant affirms it.

The development of armored vehicles (which Douhet did not know) may well be the new factor, which will make the defensive less sure and less economical. It may make a quick decision on the ground possible.

Must we admit that the mastery of the air can be definitely obtained and that this mastery will impose a quick decision, almost an immediate one? An affirmative answer to this hypothesis will certainly be controverted. There is too great a tendency to overestimate the efficacy of aerial bombardment in attacking precise targets such as are the first objectives assigned by Douhet. During the World War certain important installations such as railroad stations or yards received tons of bombs without seriously interrupting their activity. Also it is doubtful if the aviation which is attacked, even if inferior in power, will be put out of action in a few days; it must be remembered that the attacker will also undergo losses from accidents, from pursuit aviation, and from antiaircraft guns whose effectiveness is too often underestimated.

Failing in important results against the hostile aviation, the attacker may attempt to obtain a prompt decision by turning his attention to the civil population. Reprisals will follow. A period of reciprocal bombardments will ensue and the best organized population (the one with the highest morale) will win out in this duel while waiting for the land forces to impose a decision.

A slightly different view is presented by General von Eimannsberger (Austrian) in his book *Oer Kampwagenkrieg* (War with tanks). According to this author the air war should be pushed to the limit. Aviation should have two principal objectives: (a) combat of enemy aviation, (b) combat of war industry. To divide one's forces between these two missions is contrary to the principles of war; to unite them on any objective other than the enemy aviation is impossible.

Thus General von Eimannsberger thinks that the air flotillas will combat each other by all means available. In two months the peace-time airplanes and pilots will have disappeared. It is not likely that as a result of this duel there will be sufficient air forces left to inflict such great damage upon the hostile army and industry that the war can be successfully terminated by this means.

The critical examination we have sketched concerns methods advanced by Douhet as especially applicable to his country. It is necessary to extract from the doctrine the general ideas to apply to other situations in the light of Douhet's theory. The first idea is that of unity in war which, from the point of view of organization, points to the War Department and to a single commander.

The offensive only can decide. It may take place on land, sea or in the air. Douhet has chosen the air—a solution which seemed to him to conform best to the geographical situation of his country. The particular situation of another country may lead it to choose another method or a combination of other methods, provided they do not lead to a dispersion of effort.

Even if aviation does not provide the principal strategic offensive, the method of its employment is always offensive. The battle airplane is only a means to this end; the idea may be applied equally to an aerial force that would include bombing and pursuit planes; this was Douhet's original concept.

Security is of primary importance and has priority over all other missions. The possibility of attaining it cannot be ignored in determining the facilities for the offensive and this depends on the particular conditions in each country.

The only defense of the homeland against attacks from the air will be by antiaircraft artillery, which will be active in important centers and passive elsewhere.

The passive defense and the education of the population will undergo the greatest change.

The airplane will assist in the defense of the homeland by its attacks upon the enemy aviation.

In the last analysis it is essential that the army and the navy be able to continue the combat even if mastery of the sea be lost.

Apple Spit

BY CAPTAIN O. PFUI

"From the 8d per day which is issued for the pay of a soldier, when all deductions are made for clothing, for necessities, for washing, for the paymaster, for the surgeon, and for the multiplied articles of useless and unmilitary fopperies (introduced by many colonels to the oppression of the soldier for what they call the credit and appearance of the regiment), there is not sufficient overplus for healthful subsistence; and as to the little enjoyments and recreations, which even the meanest rank of men can call their own in any country, the brave, the honorable, the veteran soldier must not aspire to."

THE foregoing complaint was published anonymously in 1775 in London by an officer under the title "Observations on the Prevailing Abuses in the British Army."* It sounds strangely familiar today for the simple reason that it is set to the same motif as the less elegant words we now hear so frequently from the Red Mikes in the United States Army.

The British officer in 1775 and our Red Mikes in 1936 are both objecting to the foisting upon the rank and file of a form of sales effort as old as—well—"And the woman took of the fruit of the tree and spat upon it and with her hair cleansed it; and she gave the fruit unto her husband with her, saying that it was a delight to the eyes and was good for food, and he did eat."

The British officer in 1775 speaks bitterly of "useless and unmilitary fopperies." The American Red Mikes today (having in mind the ancient legend), condemn the same practices with the all-embracing term of "apple spit."

Apple spit, it seems, is unofficially a more important and effective cleaning material and preservative than linseed oil, cosmoline, and plain unvarnished OD paint. This attitude irks a good many of our serious-minded officers, particularly those who are pained by the devotion of others to long hours of apple polishing in the belief that they are obtaining efficiency. The guarded complaints of these Red Mikes, however, have produced practically no results to date, except, perhaps, unfavorable comments of opinion on their efficiency reports.

Once upon a time, though, in this same American Army of ours, there was a Red Mike who apparently had considerably more viscera (history books estimate twenty-seven feet) than any of our modern Red Mikes. This nonconformist, Red Mike the Nonpareil, lived in the days when a captain was really the Old Man, a major was a retired captain, a colonel was a legendary figure at another post a hundred or more miles distant, and nobody knew just what position a lieutenant colonel was supposed to fill. (Today, only the lieutenant colonel retains his time-honored niche.)

The most expert apple polisher was detailed to study the scoring formula.

Red Mike the Nonpareil objected to fancy parades, highly ritualistic formal guard mounts, flashy exhibition drills, and the numerous little inter-organizational competitions and displays calculated to take up the full time of officer and man and to delight the afternoon crinolined or stove-pipe-hatted visitors to the garrison. Red Mike the Nonpareil claimed he just could not find time to do the things he believed were genuinely important because of the unreasonable and frivolous demands made on his waking hours by the garrison commander. He said he would be damned if he would polish apples; he was reserving his spit for his thumb in page-turning and map-shuffling.

Red Mike the Nonpareil was exceedingly earnest; he resigned his commission in the United States Army.

Years passed, and then the former colleagues of Red Mike the Nonpareil began to meet him again rather frequently. They had become most expert in the use of apple spit in the meantime and could deceptively polish even a very low grade apple, but Red Mike the Nonpareil somehow always managed to embarrass them at these encounters. Out loud, they violently damned him, but it is equally true that they secretly admired him no end because he had had the vertebra to follow the dictates of his conscience even to the point of quitting the Army.

Our Red Mikes today are not endowed with the same degree of temerity as Red Mike the Nonpareil. We hear them frequently, whenever the Old Man and his staff are safely out of ear-shot, quoting obscure regulations about such things as "only pure linseed oil (or some such dull and conservative fluid) may be used on rifle stocks," or "no enlisted man shall be coerced in any manner into buying non-issue articles of uniform or equipment." They oath and fume that they will be utterly and teetotally sunk-in-a-ditch if they will buy a new Sam Browne belt with nacarat leather just because the Old Man has one.

Check up on one of these Red Mikes. You will find that the rifle stocks in his outfit look like Glassex, smell like Glassex, and wear like Glassex. Red Mike will virtuously deny the use of Glassex and will expound at length about the superiority of linseed oil and elbow grease. He has to retain his standing in the local lodge of the Order of Red Mikes. Perhaps his denials represent the truth to the best of his knowledge and belief. You will then find he has a loyal liar of a top sergeant who accumulates a *sub rosa* slush fund at the pay table, who would protect his skipper to the last bugle toot, and who knows from the advantage of his years of service that an

*The British Army in the American Revolution. E. E. Curtis Yale University Press, 1926.

ORDER anent Glassex and similar brands of apple spit outranks Army regulations every day in the week.

Another Red Mike professes to be embarrassed mightily because his trace chains are all chromium plated, just like the other outfits in the battalion. He vows that when the plating begins to scale, he is going to have it all removed and then his trace chains will be kept in pristine regulation condition. Nobody will ever detect signs of chipping or scaling, so this Red Mike will never be put to the test.

So it is with other POST customs and orders about apple spit. The Red Mikes buy nacarat leather just like the rest of the officers in the garrison, but with rumblings that put Vesuvius to shame. Then they go to a new station and meekly acquire another shade to the accompaniment of a second guarded verbal earthquake.

The foregoing is symptomatic of the spreading discontent with the current attitude that since Army regulations are designed to fit war conditions, they naturally have no bearing on peace-time garrisons. It appears now that the fundamental peace mission of the Army has been changed to apple polishing, and therefore anything war-ish in Army regulations, tending to restrict the use of apple spit, was automatically suspended at 11:00 A.M., November 11, 1918.

The Personage, for example, was hell on wheels in France, and after the war in our peace-time Army until "64" was written after his name, he was an ardent exponent of this latter-day concept of the basic principle of Army regulations in general.

The Personage once missed a sure-fire bet, it is true, but it only went to show that he was subject to human frailties just like his subordinates. He had inspected his command down to the last chalked tent rope. The results of this inspection were mimeographed and broadcast to the world. One item stood out from all the rest:

"Captain William X. Briteboy—brass on Sam Browne belt not properly shined."

The conscientious Briteboy had had his brass gold-plated for the occasion, and the Personage's mistake halted a gold rush before it got under way.

The Personage did not miss much, though. He appeared in the most unlikely places at the most unusual hours and made the most unexpected comments. The command found this out at the customary critique after his first field exercises when he publicly commended another captain for shaving at the crack of dawn, using the water from a cane-field ditch.

The Personage also knew the value of transportation shows and probably originated the present-day law: Every Vehicle MUST Be There. The command responded by bringing out every vehicle, plus all of the common brands of apple spit and a few new ones invented for especially needy cases.

One Dodge touring car, a war relic, was not quite ready in spite of a twenty-four hour schedule during the previous week in the automotive shop; after The Personage's car with its exquisite non-reg paint job had flashed

past the shop and down the long gradient toward the site of the show, the Dodge was carefully eased out onto the road. It was a beauty, and its driver was equally resplendent in reseda khaki, P.X. cap and shoes, and patent leather belt. As befitted the unusual circumstances, the Dodge was delicately and slowly tooled down the hill past where The Personage was standing with his staff.

The Personage appreciatively eyed the Dodge as it rolled by. He turned to his staff and the garrison commander.

"Gentlemen, this is indeed a commendable showing. Take that Dodge. You could barely hear its motor."

The Dodge rolled safely on behind some glittering trucks and stopped. The driver got out, sighed, and the door fell off. No matter, though. No matter, either, that the engine block was under a dirty tarpaulin in some bushes behind the automotive shop. Apple spit and the apple polishers had done their job well enough to offset such immaterial details.

And so it is today with competitions. The main thing of importance, it appears, is to win, and a good brand of apple spit is guaranteed to win every time except when up against a better brand. Even the defeated will bow to the basic fairness of this rule.

Any competition, however, can easily be put in the bag with a little ingenious application of apple spit, all of the Red Mikes to the contrary notwithstanding. Once there was a competition in artillery firing, so highly original in its scope and so exacting in its conditions that it is an apple spit classic.

According to the rules laid down, every battery in the command had to fire all of its guns. The target was to be towed across the battery front at a range selected by the battery commander. All batteries were placed automatically on an even footing by means of a scoring formula, a miracle of ingenuousness. This formula contained all manner of factors, such as an equalizing factor for type of armament, range factor, range table probable error factor, ballistic compensating factor, and a time-consumed factor. There was a hit factor, of course, in the divisor or some such equally appropriate place in the formula.

In one battalion, the most expert apple polisher was detailed to study the scoring formula. He reported back with a gleam in his eye. He also had a sheaf of calculated hypothetical scores to back up his conclusions and some sketches of weird logarithmic gadgets. After all spies were shooed off, he whispered, "It's a straight target course at four knots for us! All we have to do is beat hell out of the assumed maximums for the range factor and the time-consumed factor!"

The chaste regulation fire-control system was quietly discarded in the battalion. The target was towed as planned, four knots speed at the maximum gun range, the batteries belched, like Brownings, the logarithmic gadgets worked to perfection, and each shot was better than the one before.

The Apple Spit Battalion placed 1, 2, 3 in the competi-

tion with its lowest score some 200-odd points higher than the best Red Mike outfit was able to accomplish in depending on the Ordnance Department matériel.

Getting back to July, 1936, however, khaki caps are in the limelight at present. The khaki cap is no part of the uniform, officially; but somehow it must have quietly and unobtrusively crept in as a form of apple spit.

Khaki caps, in one command at least, are now going back into the moth balls. It cannot be worn just now, but for fear The Next Incumbent reverses the decision or the skies fall and during the commotion the khaki cap lands in the Army regulations, it appears safer to relegate this piece of dome covering to the cedar chest. After all, a khaki cap represents quite a few "little enjoyments and recreations" for a buck private.

Khaki cap or no khaki cap, apple spit or no apple spit,

the rank and file is tired of pendulum oscillations, but it is a waste of time trying to guess which way the cat will jump next.

Why not appoint a board of line officers? Give the board the uniform and allied regulations for revision. Then a little whole-hearted hewing to the regulations by all hands would be in order. And if apple spit should be decided upon, authorize its use to the limit, and make the supply branches of the Army issue apple spit in copious quantities.

* * *

Historically-minded Red Mikes may be interested in knowing that Red Mike the Nonpareil was named Jackson. His Christian names elude the writer, but when he died he was known in some circles as "Stonewall."

General Assembly OF THE U. S. Coast Artillery Association

BELIEVING that the purposes of the U. S. Coast Artillery Association can best be served by periodic meetings where the members can be brought together on a common ground of professional interest and fraternal intercourse, the Executive Council decided to hold a meeting during the present summer. Fort Monroe, the cradle of Coast Artillery activities, was the natural and logical choice as the scene of this meeting. To the majority of Coast Artillerymen, especially those hailing from the eastern part of the United States, Fort Monroe needs no introduction. To many it will be a homecoming, where they can renew acquaintances, revisit scenes of earlier activities and engage in many pleasant personal recollections prefaced by "Do you remember?"

Plans have progressed far enough to make some definite pronouncements concerning the program. No effort has been spared in order that visiting members may receive the maximum benefit in the way of inspiration, professional advancement and instruction in Coast Artillery matériel and technique. The social and recreational side has not been overlooked. The presence of wives and sweethearts will be an important factor and will greatly contribute to the success of the meeting. All those who can attend will be amply repaid for their time and trouble.

In arranging for the meeting held in New York City in June of 1934 the committee went to considerable trouble to give detailed information concerning special rates on railroads, hotel accommodations, routes into New York, etc. Experience demonstrated that this is unneces-

sary and for the coming meeting it is sufficient to say that Fort Monroe may be reached by boats sailing daily from Washington and Baltimore in the evening, arriving at Fort Monroe about 6:00 A.M. the following morning. Automobiles will be transported free of charge on the Washington boat provided the owner purchases a ticket. This saves about 200 miles of travel by automobile and provides an enjoyable boat trip down Chesapeake Bay. Those who contemplate making the trip by train from the north or west will be interested in knowing that the Chesapeake and Ohio Railroad operates two trains per day from Richmond to Fort Monroe. It is suggested that those traveling by train time their departure so as to arrive at Monroe on the evening of August 20. The morning train from Richmond arrives at Monroe about 11:00 A.M., too late for the demonstration scheduled for the morning of August 21. For those residing in the south it will be necessary to take a train to Norfolk, Va., thence by street car to Willoughby Spit, and to cross Hampton Roads by ferry, landing at Monroe.

Those who travel by privately-owned automobiles will find good roads throughout the entire trip. Privately-owned automobiles will be a convenience while at Fort Monroe and more especially in visiting points of historic interest on the Peninsula.

Every effort will be made to keep the expense to a minimum. With this in view visiting members will be accommodated in one of the camps (for men only). The cost of meals and sleeping accommodations will be provided at the rate of \$1.25 per day. It will not be necessary to bring bedding rolls or bedding of any kind. For

those who desire to bring female members of their families, accommodations can be obtained at the Hotel Chamberlin at the following special rates:

Double rooms with private bath—\$2.00 per person

Single rooms with private bath—\$3.00

Meals, \$3.00 per day American plan or \$1.00 for breakfast, \$1.25 for lunch and \$1.50 for dinner. Guests of the Hotel are given free admission to the roof garden, the use of the swimming pool and the beach. Bathers may dress in their rooms if desired. One entire floor of the Chamberlin will be set aside to accommodate members of the Association. The management promises to do everything possible to add to the comfort and convenience of visiting Coast Artillerymen. If so desired, accommodations can be obtained in near-by Phoebus or Hampton. Accommodations cannot be provided at Randolph Hall.

The Commanding General of Fort Monroe, Brigadier General Joseph P. Tracy, has appointed a committee in charge of arrangements. This committee will leave nothing undone to provide for the comfort, entertainment, and convenience of visiting members. A most interesting and instructive program has been prepared. Some of the highlights of this are:

FRIDAY, AUGUST 21

8:00-9:30 A.M.—Registration in the south wing of the Coast Artillery School building. Visiting members should not fail to register immediately upon arrival and to arrange for sight-seeing trips, sports, banquet, etc. At this time changes in the schedule will be explained and information given concerning exhibits, demonstrations and other activities.

9:30-10:45 A.M.—An inspection of the submarine mine depot and mine matériel followed by a demonstration of submarine mining to include the detonation of a mine.

11:00-11:30 A.M.—Inspection of a model barracks and other points of interest at Fort Monroe.

2:00 P.M.—Firing of 3-in. antiaircraft guns, antiaircraft machine guns and 155-mm. guns. This demonstration will take place at Wilson Park. Trains for the firing point will leave the Engineer Wharf at 1:45 P.M. Immediately after the conclusion of the demonstration firings, members will entrain for the Beach Club where refreshments will be furnished.

5:00 P.M.—Review and parade by the troops of the regular garrison. General A. H. Sunderland will take the review.

9:00 P.M.—A reception and dance will be held at the famous Fort Monroe Beach Club. Motor transportation will be furnished from the camp and the Chamberlin Hotel.

SATURDAY, AUGUST 22

9:00 A.M.—Regimental review of the 246th Va. N. G.

10:30 A.M.—Business meeting of the Association at the Liberty Theater.

Saturday afternoon will be given over to recreation and athletic activities to include golf at the Hampton Roads Country Club, tennis, swimming, or any other recreation to suit the taste of the individual.

8:00 P.M.—Banquet and dance at the Beach Club.

The cost of this banquet will not exceed \$2.00 per plate. Several prominent personages will be invited to be present. During the banquet there will be a short business meeting. Details for this will be announced later. Visiting members will be given all privileges of the Fort Monroe Beach and Casemate Clubs.

SUNDAY, AUGUST 23

This day will be given over entirely to sight-seeing trips to be arranged in accordance with the desires of the individual as expressed at the time of registration. Motor transportation will be available for visits to points of interest such as Yorktown, Williamsburg, Jamestown and Langley Field. Some may desire to go fishing in Chesapeake Bay.

The camp officers' mess will close with the noon meal on Sunday.

GENERAL

Reservations at the Hotel can be made individually or through the Secretary of the Association. The wearing of uniforms will be optional. Many will be in civilian clothes. Khaki uniforms (with or without coat), caps and black ties are recommended for wear during the day. For evening wear either the white dress uniform or the white mess jacket (with either white or black trousers) will be appropriate. It is emphasized that no one should feel embarrassed on the question of dress. Past experience indicates that there will be a wide variation in the kind of uniform, and that many will appear in civilian clothes.

At Fort Monroe will be found practically all classes and kinds of Coast Artillery matériel, including guns, fire control instruments and the numerous gadgets near and dear to the hearts of Coast Artillerymen. All of these will be open for inspection and guides will conduct parties through batteries, plotting rooms and other interesting places. It is expected that a radio-controlled, high-speed boat will be in operation and put on a demonstration. The latest fire control equipment will be on display. Altogether it is difficult to imagine how any Coast Artilleryman could spend a more pleasant, profitable and instructive three-day vacation than by arranging to be present at the meeting and general assembly of the U. S. Coast Artillery Association. Remember the dates and make your plans to attend. No effort will be spared to make this an occasion long to be remembered.



The Red Army

Condensed from a manuscript prepared for The
COAST ARTILLERY JOURNAL and *Infantry Journal*

By GENERAL NICHOLAS N. GOLOVINE

With the collaboration of
COLONEL H. PIATNITSKY

All photos Wide World.

IN the latter part of 1933 the strength of the Red Army was officially reported to be 562,000. On January 30, 1934, before the Seventh Congress of Soviets, M. Tukhachevsky, assistant to K. E. Voroshilov, People's Commissar for Defense of the U.S.S.R. (War Minister), announced an increase in strength to 940,000. On January 15, 1936, in an address before the second session of the Central Executive Committee, Tukhachevsky stated that the army had been further increased, at the beginning of 1936, to 1,300,000 men. These figures alone give an idea of the gigantic military machine the U.S.S.R. is building. In two years the army has been increased two and a half times, and at this writing its strength exceeds that of the Imperial Army of 1914 (1,284,155).

The basic Soviet law governing military service provides for the creation of this army on the principle of rigid political selection.

Until 1935 the Red Army consisted of two main parts:

(1) *The regular military establishment* made up primarily of men serving two years' continuous service with the colors;

(2) *The territorial army*, units of which were at best second-class troops whose length of service varied from eight to eleven months.

Present plans, however, contemplate the elimination of the territorial divisions by gradually incorporating them into the regular establishment. Three-fourths of the entire army has already been so converted.

Territorial divisions incorporated in the regular army divisions initially begin as mixed organizations and pass through three transition stages:

(1) Within each territorial division, two rifle regiments together with all of the other component organizations (artillery, signal, and sapper units) are first converted into regular units. This leaves one rifle battalion of the first and second regiments, and also the third regiment, on a territorial (militia) footing. Thus four of the nine battalions of the division become regular army units; the remaining five continue as territorial battalions.

(2) The next stage involves the conversion of the third rifle regiment (less its third battalion) into a regular organization. The third battalion continues on a territorial (militia) basis. By the end of this stage six of the nine battalions have been absorbed in the regular army.

(3) In the final stage the three remaining divisional units are transferred to the regular military establishment.

The majority of the fifty territorial divisions of the Red Army have already passed through the first and second stages. In the cavalry divisions the transition has been completed.

These measures doubtless enhance the combat efficiency of the Red Army and its readiness for mobilization as well. They are bound, indeed, to have a marked effect upon the military training of the Soviet man power.

The total population of the Soviet Union is approximately 170,000,000. This means that about 1,500,000 young men annually reach military age (21) and become available for service. Of this number about a third are ordinarily disqualified. There remain roughly a million that could be

called into service. Assuming that M. Tukhachevsky's statements are correct, the entire regular army, with the majority of the men serving for two years, could not absorb annually more than 650,000 men. The other 350,000 could hardly be given training within the regular establishment. Under the former system of regular and territorial units, however, a similar number of qualified men (300,000) were left without training each year.

This present annual training of 650,000 men in the regular service will eventually build up the entire reserve of trained men (19 classes of the regular service) to



K. E. VOROSHILOV
Marshal of the Soviet Union



Red Infantry

12,000,000. Imperial Russia called 15,500,000 men into service during the World War.

An important recent development that might still further increase this great total is a recommendation from certain officials to change the period of service from two years to one. This would afford training in the regular army to all physically qualified men arriving at military age and would make an army of 18,000,000 or 19,000,000 available for war. This would involve, however, the abandonment of the rigid selection method of politically desirable elements.

This question presents the alternative of choosing between the paramount interests of national defense and the preservation of political party privileges. It seems probable that the character of the Communist Party dictatorship will always sway decisions in its own interests. For this reason an abandonment of the rigid personnel selection from politically reliable and desirable elements is not to be expected.

The elimination of territorial units and their incorporation into the regular establishment, with the resulting increase in the strength of the army, constitute the most important military changes in the U.S.S.R. since 1924.

REORGANIZATION OF FORCES

Infantry. The organization of infantry units of the Red Army is patterned somewhat after the French. There is a marked tendency to increase the number of light, quick-firing, semiautomatic weapons. In the new infantry organization, for example, each company has been increased by two officers and three automatic rifles and the enlisted personnel has been reduced by 24.

As now organized, an infantry battalion has 30 officers, 584 men and 27 automatic rifles. This is a decrease of 72 men and an increase of 9 quick-firing rifles.

The increase of 40 infantry regiments during 1934 and

1935 raised the total to 255 rifle regiments, organized into 86 rifle divisions. The cut in unit personnel in the organization leaves a surplus of about 50,000 infantrymen. These are being organized into a score or more of independent rifle battalions which will be used to constitute a tenth infantry battalion for each division.

Cavalry. The Red Army now has 88 regiments of army cavalry, 25 regiments of corps cavalry, and 130 squadrons of divisional cavalry. (The corps and divisional cavalry is only partially maintained in peace time.) A recent increase in this arm speaks eloquently of the plans of the high command to organize for mobile warfare. The organization of machine-gun squadrons in cavalry regiments with 20 heavy machine guns mounted on four-wheel

spring carriages (designed for firing from these mobile mounts) further points to preparation for a war of maneuver.

Artillery. Until recently the artillery organization was based on three guns per battery; there even existed a special ideology in connection with this. In the latter part of 1935, however, it was decided to add a fourth gun to each battery. This change, when completely carried out, will increase the fire power of the artillery by one third.

Divisional and corps artillery is organized on the principle of mixed artillery groups that have both gun and howitzer batteries. Before the recent reorganization each division had six 76-mm. gun batteries and four 122-mm. howitzer batteries. The defensive artillery type of weapon predominates.

In 1935 the number of howitzer batteries in the division was increased to four and the gun batteries were reduced to four.

Aviation and Mechanized Forces. Aviation is the favorite child in the scheme of defense of the U.S.S.R. In this particular the Soviet government spares no cost. From the world markets it purchases the best types of planes and motors for the purpose of studying and reproducing them.

Next to aviation the mechanized forces receive the most generous appropriations. Here again the latest types of mechanized equipment are procured abroad with a view to reproduction at home.

The number of tanks within the Red Army is estimated at about 4,000. There are five mechanized rifle divisions: three on the western frontier; one in the Far East, along the Manchurian frontier; and one in the central part of the country. In addition, there are six independent tank regiments, twelve independent tank battalions, and six independent tank companies.

The army possesses about 300 armored cars, of which

only half are late models. There are also 84 armored trains and 15 mechanized (armored) battalions. The entire frontier guard is motorized and equipped with armored cars.

POLITICAL DEPARTMENT WITHIN THE ARMY

In the Soviet Union, as we have seen above, the army is not a cross-section of the entire population—it represents only privileged political groups. Elements of the population that are suspected of political opposition to the Communist dictatorship are not permitted to serve. Among the excluded elements are former industrialists, traders and merchants, estate owners and farmers, clericals, members of the old police, persons employing hired labor and living on an income or at the expense of others, and children of such persons. In making up the annual enrollment for service the Communists are selected first, next workers and employees, and finally peasants.

Ten years ago (1925) the Red Army was fairly representative of the Russian people but the trend has been steadily toward "bolshhevization" and "proletarianization." This has resulted in making the army into a carefully selected agency of the Communist dictatorship.

The following tabulation shows the change in the class composition of the army during the last ten years.

	<i>Workers and Employees</i>	<i>Peasants</i>
1925	15.3%	84.7%
1930	42.1%	57.9%
1935	55.5%	44.5%

It is apparent that there has been a fourfold increase in the workers' element. More than half of the army personnel now comes from this class.

Progressive "communization" of the army, as compared to the nation, is shown by the table below:

1925 (Army)	19.0%
1930 (Army)	34.3%
1935 (Army)	49.3%
1935 (Nation)	3.0%

The percentage of Communists in the army is sixteen times that of Communists in the entire country.

In the higher echelons of the military establishment the same process is evident on an even greater scale. In 1933 the officer personnel drawn from workers was approximately 42% of the total. The ideal of the Soviet dictatorship is an army officered entirely by Communist Party personnel. The peasantry is being pushed back. It is tolerated only for the time being as a necessary evil. Just why the army is officially called "The Workers' and Peasants' Red Army" (WPRA) it is difficult to comprehend. A more appro-

priate title would be "The Party and Workers' Army."

On the other hand, the increase in the strength of the army is bound to lower the percentage of proletarian elements. Apprehension over this is increasing among the Communist leaders. During the past decade it has been the practice for army leaders to announce twice annually the results obtained in increasing the number of workers and party members within the army. In 1936 (for the first time), in the report of the Commissar for Defense to the Central Executive Committee of the U.S.S.R., M. Tukhachevsky neglected to mention this subject. This violation of the time-honored custom testifies to a feeling of alarm on the part of the dictatorship. This feeling of mistrust growing out of the doubling of the military strength would be likely to increase upon mobilization. New levies would have to be drawn primarily from the peasantry. This flood, not thoroughly indoctrinated in the Soviet teachings, might destroy the party character of the army and force a change in the present policy. If this deduction is correct, then a mobilization would constitute an act of tremendous political risk for the Communist leaders—a risk which they would take only under exceptional circumstances.

It should not be assumed, however, that the Communist leaders rely solely upon the communization of the army to maintain control over it. The Socialist-Political Department and the military lawyers, paralleling each other throughout the army, from the highest to the lowest organizations, are both openly and secretly maintaining control over the activity of the military personnel, even to their manner of thinking and their personal lives. These two powerful agencies hold the Red Army in their grip.

POLITICAL DEPARTMENT AND ITS OWN ARMY

In the U.S.S.R. the central organizations of the Com-



—and Cavalry

munist party are the dominant governmental agencies notwithstanding the fact that the constitution of the Soviet Union makes no mention of them. Therefore the real governing body of the U.S.S.R. is the Central Committee of the Communist Party. The military section of this committee is the center of the Political Department of the Red Army (PDRA). M. Gamarnik is the head of this department and is also the first assistant of the People's Commissar for Defense, Voroshilov. Political departments (branches of the military department) are maintained in the military units, up to and including the division. In regiments, political commissars carry on the functions of the political department and in battalions and companies political supervisors perform similar functions. Paralleling these agencies of the central committee, there operates throughout the army a secret agency of the Special Sections of Government Safety, the former Cheka, latterly the OGPU. Through this dual-control system the Communist Party exercises its sway over the activities and behavior of the entire military personnel.

The political organization maintains for "emergencies" its own military force, which is independent of the Red Army command. In 1932 this special organization consumed one-tenth of the entire military appropriations of the U.S.S.R.—118,000,000 rubles out of a total of 1,278,000,000. This force is known as the "Praetorian Guard of the Régime." In 1935 it consisted of the following:

(1) One mixed special detachment for each administrative district center, consisting of one rifle battalion, one artillery battery, and one mechanized cavalry squadron—in all 29 independent battalions, 50 independent companies, 29 batteries, and 29 mechanized squadrons, a total of	105,000 men
(2) Frontier guards (motorized)	70,000 men
(3) Convoy guard (prison guard and guards at concentration camps)	60,000 men
Aggregate	235,000 men

This force serves to insure proper obedience to the Communist Party and unquestioned control of the army by it.

LAW OFFICERS

The other check upon the personnel of the army is furnished by the law officers. Their function is to look after the "revolutionary" legality of the acts of the officers. A law officer has the right to stop the issuance of any order by any military commander. For this reason, if there is the least doubt as to the legality of an order, the approval of the law officer is obtained before it is issued.

Any individual has the right to make written complaint to the law officer against his commander, and tens of thousands of such reports are received. By this means the law officer keeps a check on the line commander. Everywhere there is lurking the all-seeing eye and the all-hearing ear of the Communist Party. One noteworthy

effect of this is to paralyze initiative and freedom of action.

During maneuvers and in the event of war law officers are required to prepare "estimates of operations on the basis of available data."

The most curious thing about the law officers is the fact that three-fourths of them possess no military education whatever. Approximately half of them have an elementary education but not over 20% have had the benefit of a higher education. But they are all 100% Communists. The law officer tops the complex party network honeycombing the entire army.

OFFICER CADRES

Some of the results of the political measures adopted to insure the communistic purity of the army are of interest. These measures are, in truth, the Achilles' heel of the army, and have brought about a lowering of the general cultural level of the personnel. The officers, being proletarian workers and Communist Party members are lacking even in elemental education. This is a heavy price to pay for loyalty to political dogma.

In selecting students for the various military schools, the entrance requirements had to be lowered to a knowledge of the fundamentals of arithmetic, some conception of fractions, and the ability to narrate in one's own words something read from a book.

As a result of this lowering of educational standards, only 5% of the officers qualifying for preliminary training possessed an "average" education, and prior to enrollment about 40% could barely read and write. In 1934, 20% of the junior officers and company commanders and 10% of the battalion commanders were totally lacking in a general education and had but a slight conception of the Soviet military organization. In 1932 only one-fourth of the graduates of the military academy (general staff) possessed more than a fourth-grade education.

M. Voroshilov directed attention to this deficiency in his recent public addresses by stressing the necessity of raising the general educational level. In this connection it is of interest to note that M. Voroshilov's own general education was limited to a second-grade course in a village school. Yet he occupies the highest position in the military establishment and in the event of war may become the commander in chief of the Red Army.

Of the 60,000 officers in the army there remain about 4,000 who served during the World War. In this group there are some 400 former officers who attended the imperial academy. The greater part of these play minor rôles. Even the instructors at the various military schools have been replaced by new "professors" of the Soviet school. This accounts for the fact that during the past few years there has been nothing of importance in the nature of military scientific literature coming out of the U.S.S.R.

The lowering of the technical, scientific, and general cultural level is such that one is constrained to wonder

whether an increase in the strength will not be a source of weakness. Can a "primitive" officer personnel be depended upon to handle a modern army? Will it be equal to the task of handling the complicated technical and tactical problems involved in training, equipping, and leading large masses of men? Officers are selected primarily because of political dependability in order to maintain the Communist Party grip. Willingness to obey Communist Party edicts is far more deserving than the finer attributes of command and leadership.

CHANGES GOVERNING THE SERVICE OF OFFICERS AND THE INTRODUCTION OF MILITARY RANK

Until 1928 the regulations governing the military service of officers were in a state of great confusion. At that time a law was introduced requiring service in grade for a definite length of time; also definite service categories were inaugurated, which took the place of pre-revolutionary titles. This had the effect of rapidly promoting Red commanders through the successive grades. In conformity with this law, "officers" could receive assignments corresponding to command of a battalion after seven years; and by serving an additional eight years these officers could become brigade or division commanders. Considering the low educational requirements and the sources from which the officer personnel is drawn, it was soon realized that such rapid advancement would deprive officers of an opportunity to acquire ability through training and experience. Therefore, in September, 1935, a new decree governing period of service was published, which increased the minimum service requirement in each grade considerably.

It is noteworthy that this new decree provided European rank (personal titles) for those officers who were adversely affected (lieutenant to colonel, inclusive). Formerly an officer was simply a commander and was referred to by the position he occupied. It seems probable that the introduction of rank had the purpose of sugar-coating the bitter pill of deferred promotion that many senior officers had to swallow.

Under the edict of 1935 rank designations and minimum lengths of service in grade are as follows:

Lieutenant	3 years..
Senior Lieutenant	3 years
Captain	4 years
Major	4 years
Colonel	8 years

A total of 22 years' service is required before an officer is eligible for appointment to the grade of brigade commander.

The new law also carried a maximum age limit provision, as follows:

Lieutenant and Captain	40 years of age
Major	45 years of age
Colonel	60 years of age

The majority of Red officers of the grade of brigade and division commanders belong to the flock of "heroes of

the Civil War," and are approaching 50 years of age. This probably accounts for the raising of the maximum age limit for colonels from 50 to 60 years, thus making it possible to keep in the service experienced and politically reliable higher officers.

An important feature of the decree is the designation of the highest military title—Marshal of the Soviet Union. Five officers were elevated to this new rank. These individuals play a dominant rôle in the U.S.S.R. They are:

Voroshilov—People's Commissar for Defense (Minister of War);

Tukhachevsky—Second assistant to Voroshilov in matters of armament and supply of the Red Army;

Yegorov—Chief of the General Staff;

Blucher—Commander of Far Eastern Army on the Manchukuoan frontier;

Budienny—Inspector of the Red cavalry.

Close association over a period of years with Joseph Stalin and their high standing in the Communist Party were important factors in their elevation. Voroshilov, Yegorov, and Budienny served together in the Red Army from its inception. They fought together in the civil war under the immediate direction of Stalin against General Denikin's army, and against Poland in 1920. If we examine the rôle that senior military commanders play in the political institutions, it will become apparent that their military positions hinge primarily upon their influence as high-standing members of the Communist Party.

In the principal organ of the Central Committee of the Communist Party (the Political Bureau) one of the ten members—Voroshilov—belongs to the army. It is this that gives him his particular importance. He is minister of war as well as the probable supreme commander in chief of the Red military forces in the event of war.

Next in importance to the Political Bureau is the Organization Bureau. Among its ten members is one military member, Gamarnik, who is the first assistant and alternate of Voroshilov. Gamarnik controls all political functions within the Red Army and is the chief of the military section of the Central Committee of the Communist Party and chief of the Military-Political Department. He is the second eye and ear of the Communist Party within the army.

Both Voroshilov and Gamarnik are members of the Central Executive Committee. To the same group also belongs the present commander of the Kiev Military District—Yakir, who had charge of the Kiev maneuvers in the autumn of 1935. Under the new military law Yakir received the title of senior army commander. In the event of war he would become commander in chief of the South Group of Armies, in the Ukraine. Without question, Yakir is one of the most influential party members in the Red Army, where his future is quite secure.

Tukhachevsky, Yegorov, Budienny, and Blucher also belong to the same central committee, although they are only "candidates." Uborevich, also a candidate of the

central committee, commands the White Russian Military District (Smolensk-Minsk), and in the event of war would become commander in chief of the Northern Group of Armies. He, also, received the new title of senior army commander.

These men are the most influential military members in the Communist Party, and are therefore the most prominent individuals among the higher Soviet military leaders. Brief biographical sketches of each may be of interest.

Voroshilov is 54 years of age. He is the son of a railroad watchman. Until he was seven he lived in poverty with his sister. He worked in mines until he was twelve. From twelve to fourteen he attended a two-grade village school. At fifteen he became a factory worker. He received his first revolutionary baptism at eighteen, taking an active part in a political strike. In 1903, when he was twenty-two years old, he joined the Bolshevik Party. In 1905, during the first revolution, he met Lenin at the Stockholm Congress. In 1907 he participated in the London Congress, after which he engaged in transporting arms via Finland for the revolutionary parties in Russia. In 1907 he was arrested and banished to the Archangel district for three years, but managed to escape to Baku, where he continued his revolutionary activities under Stalin's leadership, operating an illegal printing establishment. He was sentenced to prison for his escape, and this time he was sent to more distant parts. His total period of banishment was seven years. At the outbreak of the World War he was employed at the Tsaritsin gun factory. Soon after mobilization he deserted at Petrograd. With the beginning of the revolution in 1917 we find him a member of the Petrograd "Soviet of Workers' and Soldiers' Deputies."

Voroshilov first became identified with important military matters in the spring of 1918 at the age of thirty-seven. Having command of a military detachment, he withdrew to Tsaritsyn on the Volga under pressure of the Germans, who had occupied the Ukraine where Stalin had full control. Stalin designated him to command the Soviet Tenth Army; but in the autumn of 1918 Voroshilov was transferred to the civil position of Commissar of Internal Affairs in Soviet Ukraine. In the summer of 1919 he once more became commander of the Fourteenth Army, operating against General Denikin.

In the autumn of 1919 he was appointed a member of the Revolutionary Military Council (political functions) of the First Cavalry Army, then engaged against the Poles. In March, 1921, he, with Tukhachevsky, took part in the bloody liquidation of the sailors' uprising in Kronstadt. In 1921 he became a member of the highest group of the Communist Party, the Central Executive Committee, and was appointed commander of the North Caucasus Military District. Three years later he was designated commander of the Moscow Military District.

After Frunze's death in the latter part of 1925, Voroshilov succeeded to the position of People's Commissar for

Military and Naval Affairs (Minister of War), and he has held that position for the past ten years.

Tukhachevsky is 43 years of age. He is a member of the old nobility and was a regular army officer in the Semenov Guard Regiment at the outbreak of the World War. Taken prisoner by the Germans in the spring of 1915, he concealed the fact that he was an officer and endured all the hardships of a common soldier. After a number of attempts to escape, he finally succeeded in reaching Holland, whence he returned to Russia, with the rank of staff captain. When the revolution was at its height in 1917, he joined the Bolsheviks. In 1918 he commanded a Soviet army, first on the eastern front and later in the south. As commander in chief on the Caucasus front, Tukhachevsky brought about the final and complete rout of General Denikin's forces in the spring of 1920.

In the war against Poland Tukhachevsky commanded a group of armies north of the Pripyet River. Here he suffered a decisive defeat due to the slow and ineffective actions of Yegorov and Budienny. In 1921 he relentlessly put down a large-scale peasant uprising at Tambov. In 1922 he assumed command of the White Russian Military District. In 1924, although lacking higher military education, he was appointed commandant of the military academy and later chief of the general staff, which position he held for about three years. In 1931 he was appointed Voroshilov's second assistant and charged with armament and military supply matters. This is the position he holds today.

Being somewhat better educated than the other marshals and entirely indebted for his advancement to his personal qualities—insight, will power and resourcefulness—Tukhachevsky is an exception in the Red Army command. He is an experienced military man of Western European stature. All recent changes in the Red Army are attributed to his newly enhanced influence.

Yegorov is 51 years of age, the son of a Volga stevedore. He is of the self-made type, having risen from a lower stratum of the population. Having completed only six grades in grammar school, he has a very limited general education. Prior to entering the army, he worked as a blacksmith but studied hard at home preparing himself for the examination for admission to the Kazan Military School.

In 1905, while serving as a sub-lieutenant, Yegorov took part in the first unsuccessful revolution and was expelled from the army in 1914. At the outbreak of the revolution in 1917 he joined the Bolsheviks, for which he was tried and imprisoned. After the October revolution this fact contributed to his advancement. During the summer of 1918 he commanded the Ninth Army, and later the Tenth Army, operating against General Krasnov's forces on the Don. At that time Stalin was serving as his commissar.

Yegorov was appointed commander of the south front in the fall of 1919. Later he was made commander of the

southwest front against Poland and General Wrangel's forces, under the political supervision of Commissar Stalin. During these campaigns he manifested a notable lack of decisiveness and initiative.

He has commanded several important military districts. In the summer of 1931 he succeeded Shaposhnikov as chief of the general staff.

Possessing no inherent natural ability, Yegorov owes his advancement entirely to his friendship with Stalin and to the political services he rendered during the revolutionary period. This man destined to become, in the event of war, Voroshilov's chief of staff is a rather colorless figure and manifests no qualities that would justify his assignment to such an important and responsible position in the Red Army, either in peace or war.

Blucher is 46 years of age. He is a worker who sprang from German colonist stock. At the age of sixteen he was working in Petrograd and Moscow factories. Before the World War he was imprisoned for two and a half years for carrying on revolutionary propaganda. There are rumors to the effect that he belonged to the officers' corps of the Austrian Army, but actually he served in the 19th Infantry Regiment and fought against the Germans. He was seriously wounded in action, and discharged for disability. Later he worked in Kazan factories. When the revolution broke out he was a member of the revolutionary committee at Samara. During the civil war he commanded a division against Kolchak's forces. In 1920 he commanded a division in the fighting against Wrangel's forces for the possession of the Crimean isthmus.

When the Far Eastern buffer republic was formed, Blucher was appointed its war minister. He commanded

a corps at Moscow for several years, and served as Yakir's assistant when the latter commanded the Ukrainian Military District. In 1929 he was appointed commander of the Far Eastern Army and has held that position for the past seven years.

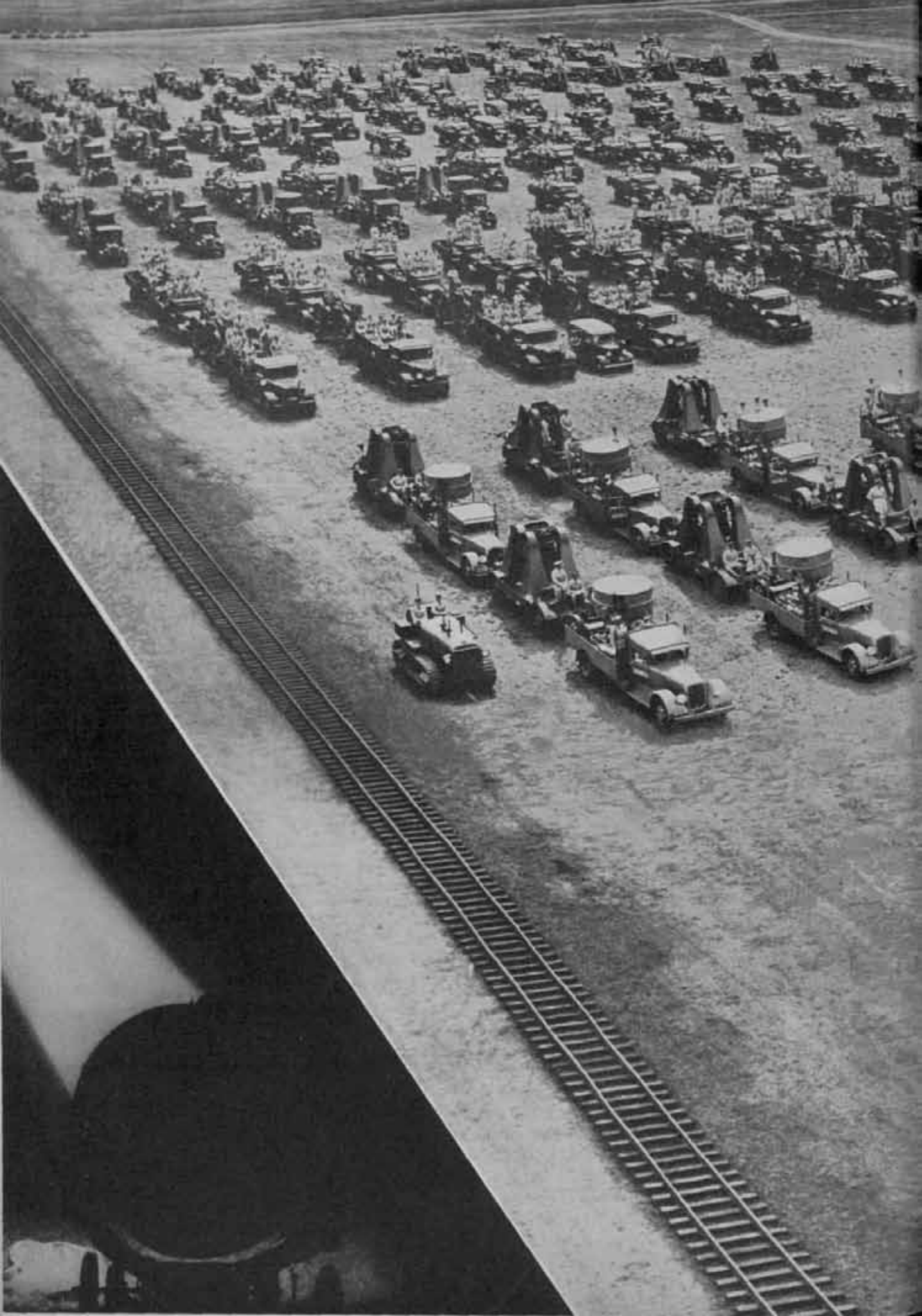
Being a hero of the civil war and possessing three Red decorations, Blucher has firmly established his position in the Communist Party. Most likely, in the event of a conflict he would play a simple rôle in the Far East as the *eye of Moscow*, whose confidence he unquestionably possesses. The actual command of the military forces in the Far East would be exercised by someone especially picked for the duty.

From the foregoing it is evident that the highest positions in the Red Army are not held by military experts. This will result in much friction in the next war, when the actual command of the troops will have to be exercised by individuals especially selected for the purpose. This renders most doubtful the intelligent employment of the gigantic military machine that the Soviets have built. The more complex its weapons the more inefficient is their direction and control likely to be.

The recent changes in the organization of the Red Army have tended to raise it to the level of other European armies. Its outward appearance attracts many observers and creates, in fact, an impression of exceptional power. From the press, from the cabinets of foreign governments, and from the Assembly of the League of Nations, emanate pronouncements concerning the increasing military importance of the U.S.S.R. But these pronouncements are based on a superficial analysis. The military student will do well to consult other sources of information for the answer to the enigma of the Red Army.



IF A POWERFUL NATION CAN ABUSE A WEAKER ONE, then it is evident that the weaker nation has placed itself in a position where it must either fight a hopeless war or surrender. I prefer to have power in the hands of the United States rather than to have the power in the hands of some other country and risk the possibility that such country may abuse it.—STOCKTON.



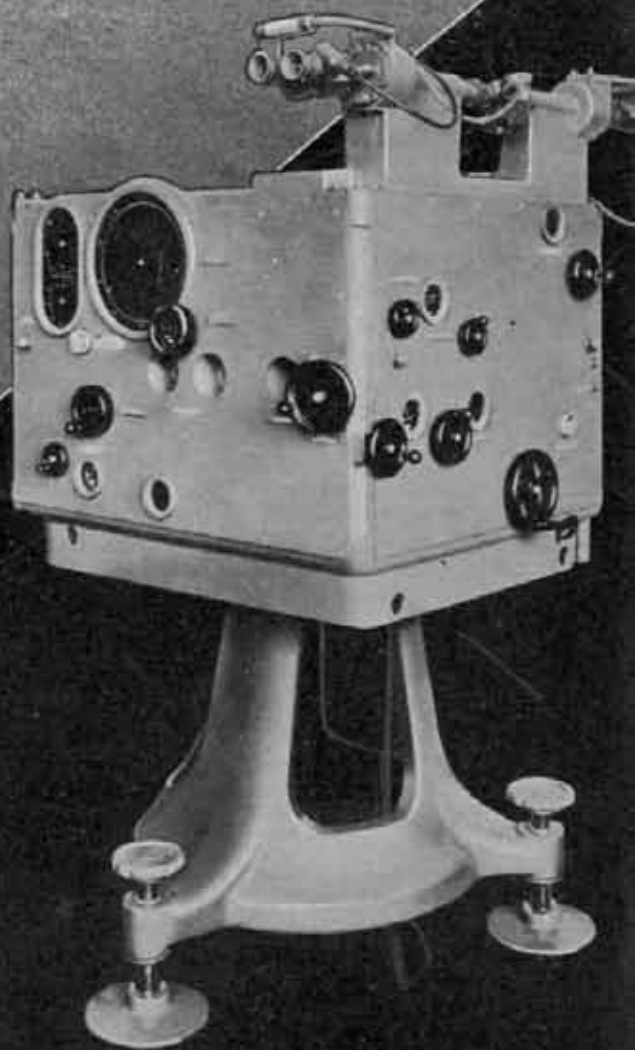


Everybody Rides But the Band

The 64th C.A. (AA) Passing in Review.

This striking picture gives a good general idea of the amount of mobile equipment required for an anti-aircraft regiment. In this is included some of the latest types of vehicles supplied under the program for modernizing military motor transportation.

Principal picture by courtesy of the National News and Photo Service, other pictures and cut by courtesy of the Sperry Gyroscope Company.



Harbor Defense

By COLONEL H. E. CLOKE, C.A.C.

PERHAPS this will be an old story, twice told, to many Coast Artillerymen, but it is believed that a large percentage of the officers of other arms and the civilian components, being fully occupied with their own problems, are not familiar with those of the Coast Artillery Corps. This non-technical discussion will take up only those general principles of harbor defense that are of vital interest to all members of the military profession and of more than passing interest to all those who believe in National Defense.

GENERAL MISSIONS OF A HARBOR DEFENSE

The coast line of the United States is considered to be divided into coastal frontiers, sectors and sub-sectors. Coastal frontiers are composed primarily of one or more harbor defenses and a certain section of the coast line. There is a distinction between coast defenses and harbor defenses. The defense of a coastal frontier presupposes a joint action by the Army and Navy and includes a defense of any portion or all of our coast by the coordinated action of the Coast Artillery and other arms in conjunction with the Navy. The Coast Artillery has in general for its basic mission, "The attack of enemy vessels by means of artillery fire, including submarine mines, and the attack of enemy aircraft by means of fire from the ground."

The basic organization of the Coast Artillery is regimental. It is organized into harbor defense, tractor drawn, railway and antiaircraft regiments. The mission of a harbor defense command may be defined as follows:

- a. To provide a safe rendezvous for the Navy.
- b. To prevent bombardment of naval bases, industries, utilities and populations.
- c. To hold an enemy fleet at a range which will permit our own fleet to debouch from the harbor and take up a battle formation.
- d. To assist the mobile forces of the Army in preventing an enemy from gaining a foot-hold, or a base of operations, in the vicinity of the harbor defense.
- e. To provide antiaircraft defense for its own batteries and accessories.
- f. To provide initially for beach defense in the immediate vicinity of batteries.

To accomplish these missions a harbor defense should be equipped with long range artillery, medium range artillery, railway artillery, tractor drawn artillery, submarine mines, antiaircraft artillery, gas defense, machine guns, rifles and pistols.

Harbor defense regiments are located at Portland, Portsmouth, Boston, Narragansett Bay, New York, Delaware River, Chesapeake Bay, Charleston, Pensacola, Galveston, San Diego, Los Angeles, San Francisco, Columbia River and Puget Sound. In Panama there are two harbor defenses, one at each end of the Canal. In Hono-

lulu there are two, one for the harbor of Honolulu and one for Pearl Harbor. In the Philippines there is one large harbor defense at the entrance to Manila Bay. There is a total of 19 harbor defenses in the United States and five in foreign possessions.

Our harbor defenses at present are able to fulfill only a part of their missions. In our foreign possessions the harbor defenses are quite well supplied with personnel and matériel, but in the United States a great many have been placed on an inactive or caretaking status, with personnel barely sufficient to keep the matériel from deteriorating. In many cases batteries, guns and emplacements have become obsolete. After the personnel necessary for our foreign possessions is deducted, the great bulk of the remainder is divided among five harbor defenses in the United States. These carry the entire load of training the civilian components in addition to their normal functions—a very heavy schedule.

The organization of an antiaircraft regiment is a subject that has long been under consideration. Normally it consists of a headquarters battery and two battalions—one for guns and one for machine guns. The searchlight battery is now included in the gun battalion. The present organization provides for a regiment of antiaircraft artillery as an integral part of the Corps, and a brigade in the Army artillery. Divisional organization does not include antiaircraft, there is some discussion as to whether or not this should be changed. Also, it has been proposed that each battery consist of six guns in place of four. Another proposal is for each mobile regiment to consist of two gun battalions, each of three gun batteries and a searchlight battery.

It should be remembered that antiaircraft artillery is yet a child in the United States Army. It was born during the World War, and it has been a very difficult matter to give it any fixed relation that will fit all cases with reference to other arms. There is also a growing belief that antiaircraft artillery would be most desirable as an adjunct to all arms of the service, especially the Air Corps. It is readily apparent that antiaircraft protection would be of immense value to that Corps, inasmuch as it would reduce the burden imposed on pursuit aviation when used on defensive missions for air fields and matériel. This is the same principle that has been applied to the Navy with reference to Naval installations.

The tractor drawn regiment is organized in a manner similar to the Field Artillery. It is equipped with the French 155 mm. gun which is used primarily to fire on hostile transports, destroyers and submarines. It also may be emplaced in certain "hot spots" along the coast line where landings or raids are probable.

The organization of the railway regiment consists essentially of a headquarters, headquarters battery, service

battery and three battalions, each consisting of two firing batteries.

GENERAL PRINCIPLES

The artillery of the United States Army is organized into the Field Artillery and the Coast Artillery. These arms function independently. Until about 1907 there was only one artillery corps divided into "Light" and "Heavy," with the officer personnel interchangeable. The present organization was built on the theory that the missions and functions of the Field and Coast Artillery were very different. There has arisen, in recent years, a diversity of opinion on this subject; especially with reference to the assignment of antiaircraft guns to the Coast Artillery. It is generally conceded that there is a necessity for antiaircraft artillery in the Division, although none is provided at present. There is room for thought and discussion on this point.

During the World War tractor drawn and railway artillery were manned and used to good effect by Coast Artillery personnel assigned or attached to Corps and Army. In this war Coast Artillery troops were inert in the coast defenses because the control of the seas rested with the allies while trained artillerymen were sadly needed in France for long-range destruction and interdiction fire.

Artillery fire control methods differ somewhat according to conditions and circumstances. For example, harbor defense artillery fires on moving targets on the water while Corps and Army Artillery normally fires on stationary land targets. Divisional artillery may be called upon to fire on tanks and mechanized units in addition to its normal functions of barrage fire and fire on stationary targets. The real issue is: would not more efficiency, both in matériel and training, be attained if the Army had but one Artillery Corps subdivided into Light, Heavy, and Antiaircraft? If landing operations are undertaken by an active enemy, all artillery available should be used to prevent it. This would come very close to being a coastal frontier problem and all kinds of artillery would be required to fire on both fixed and moving targets.

History teaches that fortifications are practically impregnable, and it is generally conceded that an efficient harbor defense cannot be reduced by gun fire from hostile ships. If coast defense systems have this one value only, then they will have fulfilled their mission. Naval vessels do not subject themselves to the fire from forts, for their own guns do not have the same accuracy and stability, nor do they have the protection afforded by the use of parapets and overhead cover.

One of the primary considerations of all harbor defense systems is to permit a nation's Navy to utilize every possible ship for search and combat on the high seas. The delay caused by the necessity of a landing operation and siege to reduce a harbor defense, will permit of the organization and concentration of a field army in the threatened area. Naturally there are limits to the value of harbor defense systems, and for this reason many harbors in the United States are not fortified.

When it comes to a reduction of a fort, all arms of the service, especially the Infantry, Field Artillery and Air Corps will enter the picture. A situation of this kind becomes directly proportional to the time factor; the greater the lapse of time between the declaration of war and the actual landing of hostile forces on our shores, the greater will be our opportunity to mobilize, organize and concentrate to resist such an invasion.

History demonstrates that frontal attacks on harbor defenses almost invariably fail. A battery or two may be silenced, but in general the system will be able to carry on, if the defense is properly manned and efficiently conducted.

TECHNIQUE

Destruction of the enemy personnel, installations or matériel is the objective of all artillery whether light or heavy. Fixed harbor defense artillery is predominately heavy, and normally fires on moving targets. During recent practices high percentages of hits have been made on targets being towed at from 20 to 30 knots. Among the many accessories necessary to a harbor defense command are searchlights, sound detectors, a sound ranging system, a submarine mine system and fire control systems. All of these are well concealed and protected whenever possible. Research and experimentation of all such accessories are continually being conducted.

An efficient system of submarine mine defense is an integral part of a harbor defense plan. Of course it would be just as difficult for a naval commander to enter a harbor in a fog, or behind a smoke screen, as for a fort to open fire on the ships. Here again the harbor defenses have the advantage. The use of submarine mines and nets would first be depended upon to prevent the passage of both subsurface and surface vessels. The use of salvo fire and barrage fire can be resorted to in such cases. It is well understood that planting mine groups would be the very first thing to do in the event of war with a naval power. This part of a harbor defense should, at all times, be kept up to the very highest state of efficiency in matériel, personnel and training. The assignment of one or two submarines to a harbor defense command is provided for in approved plan of Joint Army and Navy Action. It is yet to be shown how this plan can be worked out. Undoubtedly this weapon of search and power, if available, would be a great asset to the efficient defense of an important harbor.

Fire control and range finding systems vary in design and complexity according to the type of armament. The fire control system for a 16-inch long-range battery, for example, is quite different from that of a 3-inch pedestal mount battery. The 16-inch gun has a range of nearly 30 miles but a comparatively slow rate of fire, while the 3-inch gun is rapid and has a range of approximately 5 miles. The former's fire is adjusted by airplane or captive balloon observers, who report their observation by radio to the plotting room, where the target's course is plotted and predicted. The 3-inch gun, however, adopts the bracketing method generally used in

the Field Artillery. The fire control system used by 10-inch to 12-inch guns consists of determining ranges and azimuths to a target on a plotting board by means of shore stations.

Arguments are often heard as to the value of 16-inch long-range batteries for harbor defense. It is held by all who have given unbiased thought to the subject that the mere presence of long-range, high-powered batteries in a harbor defense will force a naval commander at least to hesitate, if not refuse, to bring his ships within their range. Perhaps it would be the better part of wisdom to encourage propaganda, somewhat exaggerated, as to their number and power. Certainly, it is the height of folly to permit a hostile fleet with guns of longer range to lie just outside the range of the harbor defense armament and bombard at their leisure the utilities and population within the harbor.

Again one often hears statements to the effect that hostile aircraft could destroy our forts by bombing. This is answered by the fact that all gun emplacements could and *should* be given overhead protection, or at least concealment. Where hills can be utilized, the emplacement of guns in casemates with 30 to 50 feet of sand, rock, etc., overhead would render them immune to aerial bombing.

It has been argued that long-range batteries are of no value when ships are beyond the horizon and cannot be seen from shore or are obscured by fog or a smoke screen. Within recent years, target practices have been held under these conditions and a good percentage of hits have been obtained. Especially comforting and satisfactory results were obtained by long-range batteries in some of our Insular possessions. The fire-control methods used in these cases were not divulged. It might be added that conditions which would prevail in war were closely adhered to. This alone would warrant the continuation of the policy of strengthening our harbor defenses with long range batteries. As to firing in a fog or smoke screen, it can be safely stated that in such cases the enemy is under as great a disadvantage as the shore battery. The enemy can neither see nor hear, while on the shore the defense can hear but cannot see. Sound ranging here enters the picture, and if a ship's propellers are turning the shore batteries can open fire on targets in a fog or obscured by smoke.

On many occasions, considerable discussion has been indulged in as to the relative value of mobile heavy artillery and fixed defenses. The railway gun, for example, can hardly be classified as mobile in its fullest sense. It has strategic but not tactical mobility. It must be provided with a stable base and this requires time. Many students of this phase of artillery mobility now generally concede that the 8-inch railway high-powered type of gun is about the limit for rapid emplacement of railway artillery. Where harbor defenses require heavy artillery protection, fixed batteries should be the general rule, but due to the missions of such defenses these fixed batteries

must be supplemented and supported by mobile artillery as the special situation demands.

Much has been said concerning the value of this anti-aircraft artillery, but of all arms sorely needed in all of our problems and maneuvers, it is efficient anti-aircraft artillery that is most desired. The anti-aircraft gun is a comparatively new weapon and during the World War it was not very efficient; today it is a different story.

We have produced but little anti-aircraft artillery due to lack of funds. Our present armament consists of the 105 mm. (about 4 inch), the 3-inch, the caliber .50 and caliber .30 machine guns. The 105 mm. is a most promising weapon. It has a high velocity, a range of about 37,000 feet (no airplane has yet reached this altitude), the projectile carries a large charge of high explosive and it can fire at the rate of 13 shots per gun per minute. The present mobile 3-inch type is credited with a good record of hits per gun per minute, and the records are getting better each year. This gun is semi-automatic and is equipped with a mechanical robot fire director. It is understood that a mechanical fuze has been designed which has proved its accuracy but it has not been issued for target practices. The 3-inch gun has a vertical range of 27,900 feet and fires 25 shots per gun per minute.

We are continually getting better and better in fire control design and our guns and carriages are continually improving, fuzes have made a marked advance and there is every indication that the anti-aircraft fire of the future will become more efficient, in fact it *must* become so. Many years ago our percentage of hits with heavy guns was very low, but when mechanical methods of fire control were introduced the number of hits per gun per minute was marvelously increased. The tendency of all anti-aircraft engineering is, first to increase velocity in order to flatten trajectories and decrease the time of flight, and second, to increase the rapidity of fire by automatic mechanical design. Improved methods in gun manufacture have decreased the weight, cost, and difficulties of construction. If an anti-aircraft gun wears out it is a simple matter to install a new liner; this can now be done in the field. Overhead protection for anti-aircraft artillery has been discussed at various times, but due to the mobility of this weapon and its ready adaptation to camouflage or concealment, the advisability of even considering overhead protection is doubtful. One of the greatest difficulties with anti-aircraft artillery today lies in the sound locator which must be relied upon for night firing. This subject is being intensively studied and recent results indicate a satisfactory solution. The use of radio beams and heat or infra red rays are utilized in some countries.

It is generally conceded that a modern, well-equipped and well-manned harbor defense will offer serious resistance to an enemy attempting to enter the harbor or to bombard by naval artillery the contiguous territory. It will force him to reduce it by attacks from the landward side following hazardous and difficult landing operation on some other portion of our coast line.

In conclusion it should be mentioned that as in times past, so will it be in the future with reference to war weapons. When the spear was invented, the shield was its opponent. Then came bows and arrows, gunpowder, ballista, cannon, gas, airplanes, submarines, super-dreadnaughts, machine guns, tanks, antiaircraft guns, etc. In each case efficient defensive weapons were developed. The airplane undoubtedly changed the method of warfare, so did the automobile. So many mechanical miracles have come to pass within the last 50 years that one

can never tell what will be the final outcome. If for example we, through an experimental period of many years, have succeeded in making 100% hits on swiftly moving targets on the water, it is entirely possible that we may be able to greatly improve our present performance when firing on aerial targets.

So in the final analysis we can usually depend upon the old adage "Necessity is the mother of invention" and look for many radical changes in weapons and tactics due to the inventive genius of man.

Antiaircraft Defense in France

THE *Journal of the German Association for League of Nations Questions*, in its issue of November 29, 1935, published a description of the antiaircraft defense system planned for the protection of French territory. The accuracy of the figures given is not guaranteed. The number of antiaircraft gun batteries contemplated for the defense of Paris is considerably in excess of the number actually in place in October 1918. It should be noted that a considerable part of the active antiaircraft defense, and the whole network of the aircraft warning service, centers at Paris. Quoting from the report we find that:

Thanks to the efforts of Marshal Pétain, the entire antiaircraft protection of home territory has been combined since February, 1931, by the creation of the D.A.T. (General Inspectorate of the Home Air Defense), of which he was head, until he was replaced by General Duchens and appointed War Minister in February, 1934. The importance attached to this is based on the fact that the Inspector is one of the few members of the Supreme Council for National Defense.

The duties of the Home Air Defense are divided as follows:

- I. *Indirect Defense* by air attack as a measure of reprisal.
- II. *Direct Defense* by,—
 1. *General (Governmental) Security measures.* (Aircraft Warning Service).
 2. *Active Defense—Military Defense (D.C.A.).* by means of,—
 - a. Fighter airplanes (air defense).
 - b. Ground defense (D.C.A. proper), to include,—
 - (1) Antiaircraft guns of 105 mm. and 75 mm. caliber.
 - (2) Machine guns of 13 and 7.5 mm. caliber.
 - (3) Barrage balloons.
- III. *Passive Defense.*

The *Securité Générale* (aircraft warning service), the agency charged with the transmission of information, is given special attention. The whole of France is covered with a network of information lines with observation posts at intervals of ten kilometers. The meshes of this network are drawn together to form information centers,

where antiaircraft intelligence reports are received, recorded, evaluated and, if deemed necessary, forwarded to neighboring centers and finally to Paris. This network is based upon the army and postal long distance telephone lines. All arrangements for the communication network, including material, equipment, and the distribution of the personnel, are carried out by the War Minister with the assistance of the home air defense service. A further task of the *Securité Générale* is the establishment of centers for spreading the alarm and ordering the extinction of lights. Also these centers cause ground defense measures to be taken.

For the purposes of ground defense, i.e., the active military defense, a credit of 400 million francs was granted in 1930. It was used for acquiring a large number of mobile and semi-fixed batteries and antiaircraft machine guns. The so-called semi-fixed guns can be easily and rapidly moved to new positions.

The active mobile antiaircraft artillery is equipped with 75 mm. guns and organized into five artillery regiments. All of the regiments, except the 404th, are stationed east of Paris. Two batteries are stationed in North Africa.

According to the *League Armaments Year Book* for 1935, the five regiments are organized into 25 groups comprising 40 artillery and 10 searchlight batteries. It is believed that a mobile antiaircraft group has three batteries, of four guns each, and a supply column. In the searchlight batteries a distinction is made between those intended for use at the front and those for use in home air defense. The latter have a varying number of 150 cm. searchlights, while the former consist of sections of four searchlights with a listening apparatus. Each searchlight is connected with a source of electric power and the two together are known as a "photo electric section." The plan contemplates a searchlight for each gun.

As a rule the antiaircraft machine guns are not combined in special formations; for the most part it is intended that they provide protection for ground troops against attack from the air. For example, in the case of cavalry regiments each half-regiment is allotted a ma-

chine gun group, consisting of two heavy and one anti-aircraft machine gun. There are a number of fast motor vehicles equipped with platforms on which anti-aircraft machine guns are mounted. The armored cars have anti-aircraft machine guns for their own protection.

At "sensitive points" on the seacoast there are air defense formations, also the frontier defense works are provided with strong anti-aircraft protection. The large anti-aircraft formations belong to the artillery reserve. The several organizations of the home air defense are partly under the command of the D.A.T. or, when ordered by the Commander-in-Chief, they may be placed under the commanders of the armies or groups of armies or, (when so ordered by the General Staff [Sic]) the commanders of the districts.

The air defense of the armies is organized by the army itself; one front group per army corps and several groups behind the lines, depending upon the importance of the "sensitive points." During an advance the front group is under the command of the army corps; at other times the entire D.C.A. is under the command of the head of the air force of the army, to whose staff a D.C.A. officer is attached.

The balloon barrages belong to the air forces and are established by the airship troops. The protective balloons are organized into sections of 20 balloons and 10 winches and belong to the airship companies of the D.C.A. As anti-aircraft protection each balloon company (including

the fixed observation balloons) has 6 Hotchkiss machine guns.

It is impossible to give the number of the French anti-aircraft weapons with any degree of accuracy; published figures vary greatly. If we assume that the anti-aircraft regiments consist of 25 groups corresponding to 75 batteries with four guns per battery we have a total of 300 guns. This figure means little or nothing as it is impossible to estimate the number of guns in depots. Nor is it possible to state with any degree of accuracy the number of fixed guns in the seacoast and frontier zone and at the "sensitive points" of the home territory. The same remarks apply to machine guns.

According to press reports, anti-aircraft protection of Paris is provided by establishing two protecting belts; one consists of 12 positions located on an average of 10 km. from the center of Paris, each position has 3 batteries, 9 listening posts and 9 searchlights. The outer belt consists of 14 positions at a distance of about 15 km. from Paris; each position is to be equipped with 4 batteries, 12 listening posts and 12 searchlights. In addition it is stated that 5 of the outer forts each have a 105 mm. anti-aircraft battery. This makes a total of 97 batteries for the anti-aircraft protection of Paris, seemingly an excessive number, but when one contemplates the experiences of the World War, when air attacks were carried out on infant wings, one can readily understand the frenzied desire of the French not to repeat the experience.

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As the Twig is Bent

BY CAPTAIN E. R. GUILD
Coast Artillery Corps

THE title of this article might better be "As the Twig is Unbent," for the twigs which come to the high school ROTC are, figuratively speaking, already somewhat bent. Physically, there is the bend in the shoulders common to the gangling youth in spotted cords and rumpled shirt, without pride in bearing and personal appearance. Mentally, there is the bend induced by earlier parental and pedagogic indulgence, the tendency to regard training as subordinate to play, and to regard manhood as something to be acquired in the nebulous future.

Comes a new face to the ROTC; its owner grins a friendly grin. "Name?" "Buddy Smith." A solicitous parent, usually a mother, hovers in the offing. Down on the roster is written, not "Buddy," but "Smith, R.," another man in the Corps. He is so addressed, so treated—no longer just a schoolboy with a parent to fight his battles. He is on his own, but the change is sometimes not without its struggles, its slip-backs, and its anguished parents.

At this point, suppose we imagine the passage of one to three years, while "Buddy" is becoming "Smith, R.," or perhaps Cadet Captain Robert Smith, and let us look in on a high school ROTC unit.

Here is the Boise High School unit, and toward the end of the year we find it on the drill field, going through its biggest day.

In the stands, the governor of Idaho and some two thousand Boiséans look on. Here also is the corps area commander's inspector, watching with a critical eye.

A steel-helmeted platoon in full field equipment marches on the field, pitches shelter tents, goes through a physical drill, demonstrates training in marksmanship, mapping and first aid. It is the "Field Service Platoon"—picked men all.

It clears the field at the double, and there follow platoon and company competitions for precision awards. The "Bonneville Rifles," white cross-belted crack platoon, perform—more picked men organized on the pattern of the Pershing Rifles—hard-pressed by the other platoons.

Now come the sponsors. Girls! A platoon of thirty-two of them in uniform. They duplicate the cadet formations and the contest is a well earned draw. More about the sponsors later.

This article was received on May 4, 1936. Through it ran the theme and the quotation "As the Twig is Bent." A few days later the *Saturday Evening Post* for May 9 made its appearance; it contained an article under the caption, "As the English Twig is Bent." This was pure coincidence, not only in the title, but in the significance of both articles. The Editor wishes to absolve Captain Guild from even the remotest suspicion of plagiarism. Subsequently the article was returned to the author and he added a paragraph drawing certain comparisons between the training in the high school ROTC and the training in the English public schools.—ED.

... the chance to toughen the steel in the armor of his character.

Again the steel helmets; deployed this time. They don gas masks, throw grenades; in a rattle of blank fire they build up their line by squad rushes, and disappear in a cloud of gas-simulating smoke.

Retreat and review by the governor close the day.

"A good show," says a spectator. Yes, but there was plenty of work behind it and there is plenty of work still ahead.

There follows a week known to the initiated as "high-pressure week," when all the class-room theory of the year is reviewed. Azimuths and gisements are given an airing; musketry, patrolling, hygiene, and the dilemmas of *Sergeant Hill* are well dusted off. Again comes the inspector, and the perennial question in every cadet's mind, "Will the Corps keep the red star of Honor High School for another year?"

Now for the final job of the year, the real test of discipline and training. Boise holds an annual Music Week out of doors on the Capitol steps; formerly the programs were nearly drowned out by sky-larking juveniles and loquacious spectators. For two years the Corps, with a system of sentry posts and patrols, has handled the crowd of four thousand and policed the grounds in such a way that audiences have been undisturbed and undisturbing; the Corps must do this job again, and then its year will be over.

What of the year's work leading up to this climax? Here is a sample day during the indoor season.

As the school doors open, the cadet guard raises the national flag. Indoors, the cadet officers stand morning inspection to meet the daily requirements of shining leather, gleaming brass and spotless uniforms smartly worn. A half hour of officers' school follows, to assure the commandant that cadet-officer instructors have mastered the subjects they will teach later in the morning.

Eleven o'clock finds four classrooms of cadets standing at attention for roll call. They take a daily written quiz to test their preparation; then a lecture or blackboard demonstration.

At noon, up to the commandant's desk march the cadet officers of the day; the old O.D. reports events on his tour of duty and his check of rifles in the armory. The sponsor O.D. follows with a detailed rating on neatness of the guard. Instructors file their daily reports; the adjutant completes his "skin" list; a brief officers' call, and "dismissed."

At 3:30, the rifle team turns out in the gallery range, while outside, in full dress, under the eyes of the cadet and sponsor O.D.'s, the guard stands retreat. Passers-by

FIRST DAY



"As the twig

FIRST MONTH



is (un) bent

FIRST YEAR



so grows the tree"

take notice and approve. Said the Boise *Capital News*, April 14, 1936, editorially:

ROTC students put the flag up every morning and take it down every evening with appropriate services. Such care as that flag gets is sure to create respect.

Indoors again, the O.D. works with the "skin" list, a small squad of minor miscreants, until 4:30, when recall sounds and the building is emptied.

Later in the evening, during the mapping course, cadets tune in to station KIDO, Boise. Over the air come talks on topography—a map contest. "Radio Homework" it is called. It has its advantages; there can be no stalling, no asking of foolish questions.

The indoor season provides plenty of drill, physical training and minor tactics. The new men learn to "take it," to obey. The older men get the feel of command. This year the Corps was "wired for sound"; a portable public-address system, powered by a car battery, put the commandant, microphone in hand, at the side of each marching cadet. Not a poorly dressed rifle or a careless error escapes the 10-watt voice of correction and encouragement. Sousa's band enlivens the seven-block march to the drill field.

Now for the sponsors. In winter they are uniformed in navy blue and gold; in summer in white and gold. Their caps are the "overseas" for service and the "pill-box" for dress; their arm, the swagger stick. The sponsors are the pick of the school, and are elected by the Corps. No honorary sinecure is theirs. They work and parade with the battalion; make all its decorations; run the annual banquet and ball; award a gold medal annually to the neatest cadet, and assist in many school and community activities. For themselves, they gain in leadership, physical development and poise.

Contrary to a popular misconception, which is not prevalent in Boise, the function of the sponsors is not to add "glamour" to the Corps. It is doubtful if they ever attract one enrollment to the unit. Our "Buddy" Smith still retains a modicum of disdain for girls as such; once he becomes a cadet his scorn changes to respect, as the girls set a fast pace in discipline, smartness and, yes, even in drill. The sponsors are a self-contained unit, helpful to the Corps, but with many additional school and community functions not connected with the battalion.

The Boise unit hears much about the obligations of citizenship, and puts the theory into practice. After the disastrous flood in the East it turned out for the Red Cross and assisted in raising funds. It handles football and pageant crowds. Last winter it worked for traffic safety, selling death maps and turning over \$100 to Boise's new safety council. It sponsored the building of sidewalks to keep school children off fast traffic roads in outlying districts; result: the sidewalks are being built. It made traffic violation enumerations in cooperation with law-enforcement agencies.

So much for what the Corps does. Now what does the cadet acquire from all this? One thing he does *not* acquire is militarism. In the ROTC course the student

comes to know, among other things, the exact explosive effect of a caliber .30 bullet as it hits the full bladder or intestine, in complete clinical detail; the details of shock, gas burns, and so on; the responsibilities, infections and miscellaneous miseries incidental to the campaign. The cadet has an intelligent basis for his dislike of war; of the two, the student not taking ROTC is more likely to think of war as a glamorous outing.

Now back to twigs. The saying is, "As the twig is bent, so grows the tree." This, whether an exact quotation or not, is the silent theme song of the Boise unit.

To start with, it is the creed followed in physical training. Let the accompanying pictures tell their own story, and save the linotyper a stick of type.

Again, it is the creed followed in discipline. The goal of the unit is military discipline, not schoolboy discipline, where erasers are tossed whenever the teacher's back is turned. It is attained, but not without labor. The cadet officers and NCO's, closely supervised, administer it. Kind of hard on the lads? No, the Corps is proud of it.

"Huh!" says a short man with a glint in his eye, "The stiffer the discipline, the better we like it. We didn't join the ROTC to be petted."

A high-school student fifteen or sixteen years old a man? Yes; manhood is not all a matter of age; responsibility counts. The boy who shoulders it becomes a man. It happens day by day in the Corps; the schoolboy look fades, and far back in the eye the spark of purpose grows brighter.

Step into the orderly room at about mid-year. The commandant has assembled the candidates for cadet commissions. Listen:

Gentlemen, when you have taken the solemn oath of office of cadet officers of this Corps, you will put on your shoulders the bright insignia of honor and authority. Simultaneously with that act, there will descend upon those same shoulders, whether you will it or not, the main attribute of command. It cannot be seen and admired by your friends and, unlike your rank discs, it cannot be unpinned or put aside. It is responsibility.

Attempt to evade this responsibility, and you will be immediately removed from command. You will hold our rank not just for past performance, but for future daily performance. You will be held responsible for good results, not just good intentions.

Loss of your commission might embarrass you or your parents. If you remain in the ranks, you incur no such risk. Think this over, and if you are not prepared to take the risk, see me privately later and tell me so.

Such is the traditional warning given each candidate for cadet commission in the Reserve Officers' Training Corps at Boise High School. In four years, not one cadet has been unwilling to take the risk. After a year or two of learning how to obey, the better youth is eager for a joust with responsibility, but he requires a firm hand to steady him under it when the burden becomes irksome.

This is where the junior ROTC fills a need not supplied by any other educational agency. At the age where the boy should, but under our present system seldom does, start to become a man, the ROTC gives him not



just tactics and technique, but the chance to toughen the steel in the armor of his character, to try out his shield and spear, to feel the weight of responsibility, and to experience the anguish that inevitably follows failure to bear responsibility entrusted to him.

Here is where a parallel should be drawn between the American high schools having ROTC units and such famous English public schools as Eton, Harrow and Rugby. A writer in a recent issue of the *Saturday Evening Post* states that the most important ideal which these public schools of England hold to is that of training the boys in certain qualities apart from proficiency in studies. These are manliness, responsibility, initiative, and loyalty. He goes on to state that the graduate of the English public school must be a good officer; that the boy must first learn to obey and take his medicine without whining, and then, when he is a senior, he must be able to command and maintain discipline and order.

That article on the English public schools might well be mistaken, in the parts mentioned, for a description of the ideals of the American high school ROTC. The ultimate objective of the English public schools, to turn out men with a strong sense of loyalty and duty who will contribute to the national life, is no less the aim of the American high school ROTC.

There may be persons—even military men—who, because of the youth of the Junior ROTC cadet, have doubted the value of the Junior unit in the general scheme of national defense. True it is that the Junior cadet lacks the equipment with which to assimilate the more advanced military work, but it is equally true that he is at that stage in his mental and physical development where he has the greatest need of, and is most responsive to, training in bearing, in discipline and in responsibility. Herein lies the secret of the value of the Junior ROTC.

"As the twig is bent, so grows the tree."



"THE YOUNG MAN . . . when he first goes to the wars . . . must know he is bound to respect all his superiors, to be civil to his equals, to be courteous to all officers, and to have charity for all those under his command."—PRINCE OF CONDE.

Publicity and the Service

By CAPTAIN PAUL L. REED, C.A.-Res.

PUBLICITY plays an important rôle in shaping the thoughts of the collective American mind. Highly organized, skillfully written publicity, especially the kind that appears in the daily press, is a creator and influencer of public opinion. In the service, the natural professional reticence toward publicity has become more or less a tradition and has resulted in a profound public ignorance of the normal functions of our armed forces. In the absence of reliable information, the general public is apt to form erroneous conceptions. Recently a very definite tendency is apparent in a number of the departments of the government to publicize their work. Both the "how" and "why" of many functions of government are being clearly explained. The military service has naturally lagged in this respect—probably because of technical as well as ethical reasons. However, there is slowly developing within the service a tendency to join the procession and give the Army some publicity.

This brings to the officer personnel a new responsibility in which few have had any training. As in the case of other responsibilities, the officers will accept this new one, learn the technique of doing it, and then render efficient performance. While some special aptitude for this work is highly desirable, in many cases circumstances will require that officers with no previous experience be given publicity assignments.

This article will outline some of the duties of a publicity officer; discuss what makes news valuable; offer suggestions on the value of publicity; and give some hints on the writing of news.

The duties of a publicity officer include:

- (1) Contacting the press.
- (2) Contacting the service sources of publicity.
- (3) Supervising all service publicity.

Contacting the press may at first seem to be a small and unimportant duty. As the work progresses it will become apparent that this is far from being true. The technique of contacting the daily press is neither difficult nor complicated, but a knowledge of the workings of the news gathering machinery will be very helpful to the officer given a publicity assignment.

The press may accept service news because the army is a national institution, is a source of human interest copy, and furnishes "local filler" news stories.

News of the Army as a national institution, such as information on appropriations, strength, new arms and equipment, and statistical data, will come from higher authority and will be an expression of a policy and often has limited news value.

Human interest copy covers a large territory. In the language of the news gathering fraternity it means all copy in which a characteristic, a quirk, a peculiarity or an ec-

centricity is emphasized or played up as the important element of the story. The following is illustrative:

PICTURESQUE OLD SOLDIER RETIRES

Presenting a real-life version of the old-time Army recruiting posters that gave many of the now ranking members of the Service their first impression of the U. S. Army, sixty-two-year-old Sergeant John A. Johanson, picturesque veteran of more than 30 years' active service, who still sports an impressive handlebar mustache, will be retired from the Army this (THURSDAY) afternoon at ceremonies to be held at Governors Island. Colonel Reynolds J. Burt, Commandant of the U. S. Disciplinary Barracks, who will participate in the retirement formation today, has issued a general order praising Sergeant Johanson's record and characterizing him as "one of the surviving members of that fine old school of enlisted men, symbolized not only by the outstanding wearing of immaculate uniforms, but in addition, by the military mustache which so distinguished the Service over a quarter of a century ago."

PERSHING ARRIVES; GREETED BY OLD SERVICE AIDES

When General Pershing arrives in New York City this (THURSDAY) evening on the S.S. *Washington* he will be met at the pier by an officer who was his aide in France, by an enlisted man who was his orderly in the Philippines, and who later was an officer at GHQ, AEF, and by a representative of Major General Dennis E. Nolan, who was Pershing's G-2 in France.

The two Army officers and the enlisted man who will greet General Pershing are: Lieutenant Colonel James L. Collins, General Staff; Captain Carlisle V. Allen, Infantry, ADC.; and Private First Class Floyd C. Mims, all on duty at Governors Island.

General Pershing has been in France in connection with his work for the Battle Monuments Commission. While in New York he will stay at the Waldorf-Astoria.

Since stories of this type stand the best chance of publication, they are worthy of study. The story of the retiring sergeant is routine, except in the manner in which it is handled. The emphasis on the sergeant's hirsute adornment gives the story interest to a great many more readers than the fact of his retirement.

The chief interest in the second story is a sentimental one, quite outside the bare reporting of news. Although General Pershing is mentioned, the interest centers in the men who met him at the boat. The story gives the readers an opportunity to associate themselves with the experience of meeting a comrade in arms. Both stories possess human interest.

In addition to contacting the press, it is necessary to contact the service sources of information such as the commanding officer, the adjutant, the welfare officer, the chaplain, and individuals with a news personality or with a nose for news. The adjutant is usually the best source of news. Across his desk go all types of official business: orders, memoranda, and other data. He is the contact man with the commanding officer and higher au-

thority. He knows what is going on in the post and what is to happen next. A brief daily contact with the adjutant is essential if the publicity officer is to adequately cover his assignment.

The welfare officer will have contact with athletics and recreational activities, and part of the social life of the post. If another officer is given the publicity assignment the two should cooperate because their work will normally be closely associated.

The chaplain will have a group of contacts that will be valuable to the publicity officer. On every post there are one or more individuals whose attainments or outstanding ability will furnish the theme for good news copy; in this be sure to include the commanding officer.

In obtaining news through personal contact, it is important to consider the policy of the commanding officer; the type and amount of news preferred by the local press; and the number and the character of the readers.

Since it is the duty of the publicity officer to supervise the collection, writing, and distribution of the news stories, it is evident that a good part of the responsibility for publication is his. The material prepared for publication may have to be OKed, but because of the speed with which much of the copy is necessarily prepared, OKs frequently are perfunctory or omitted.

Publicity is valuable as it creates and sustains a desired public acceptance. For this purpose the human interest type of story is usually best because of the tendency of a reader to project himself into much that he reads. The reader associates himself with the news personalities; he believes the hero to be much like himself. Many news stories depend on this habit of sympathetic experience for their interest.

The best way to sustain interest is to excite it regularly. In spite of this the news range that the publicity officer has to offer is small, and there is a danger that the readers will skim over news repeated too frequently as "old stuff." It is here that the skill of the publicity officer must be brought into play. When he needs help, the first place he should go is to the newspaper man; he is just as anxious as the publicity officer to get interesting copy, and his slant, coming from constant contact with his paper, is always valuable.

Another place to go is to the post photographer or to the staff photographer of the newspaper, for suggestions. According to a Chinese proverb, "a picture is worth ten thousand words." A picture of a distinguished visitor, a special ceremony or a new or unusual activity on the post, will always get consideration. The publicity officer should read the newspaper he is using. Each editor has some favorite type of stories. Reading what he uses gives many hints as to what should be prepared.

The coverage should be carefully checked; stories should be prepared to the best seasonal and weekly advantage. By coverage is meant getting the proper types of news stories to the papers that will use them, as well as reaching the widest possible reader field. Spacing in-

cludes not only releases at regular intervals but releases for particular days and even editions.

The volume of news will vary from day to day. For example, it is the experience of many newspapers that the lightest days for news are Tuesday and Saturday. For this reason, stories that arrive in the news office on these days will have a better chance of publication than on some other days. Releases for special days or editions should be worked out carefully in advance.

WHAT MAKES NEWS VALUABLE?

Timeliness and reader interest are two factors which determine the value of news. The former is vital. It seems trite and commonplace to say that news should be timely. People are interested in things as they happen. They want to know the time of the last earth shock, the last race that has been run, the last vote of the House—they want today's news today.

Will it interest our readers? This is the determining factor in the selection of routine as well as special material. An editor asks himself this question each time he gets a news item. Two checks on this are "reader range" and "importance."

By reader range is meant the number of readers that will be interested in it. The circulation makeup is as distinctive as its mechanical makeup. For example take two newspapers—the *New York Daily News* and the *New York Herald-Tribune*. The first is the most successful of the so-called tabloids; it is brief, breezy, sensational in its pictures, headlines, and copy, full of "heart-interest" and with departments which reach out into many fields quite outside a strictly news coverage. The *Herald-Tribune* is one of the "old-line" newspapers, one that believes in working strictly within the channel of accurate, impartial, and complete reporting of news, the value of which is weighted by intelligent newsmen who write for intelligent news readers. While these two newspapers represent extremes, every newspaper has its own limits of readers and its own way of covering the news; a way its editors believe the best to arouse and keep the interest of its readers.

Editors use three simple rules for determining the value or importance of a news story. The first rule is *nearness*. The germ idea is in the old story about the Irishwoman who had just heard of the train wreck in which twenty Italians and one Irishman were killed. She expostulated: "The poor man." The leading story on page one will likely tell of a fatal accident in the city the previous day, while a disaster in Africa, which cost a hundred lives, will be tucked away in a single paragraph on page 12. People want to know what their friends and neighbors are doing and are interested not only in their success and good fortune, but also in their troubles and misfortunes.

The second rule is *recentness*. This differs from timeliness in that the speed of reaching the printed page is not so important. As long as the news is fresh enough to be

easily recalled in the minds of a large part of its readers, more exact timeliness is not required.

The third rule is *public recognition*. This means that the person, place, or situation which the news story features, must be recognized by enough readers to have a general interest. The strain of reading must be kept at a minimum by taking advantage of every possible carry-over of news interest. The fact that some newspapers are more difficult to read than others is in part due to the fact that the more difficult paper has less public recognition stories and more new names, facts, and ideas.

WRITING THE NEWS

It is difficult to say that one item is a news story and another is not. The range of reader interest is so broad that some editors attempt to print practically every type of story. Others try to keep the bulk of news stories within the limits of what they consider interesting for their representative readers.

News is variously defined, the following simple definition will suffice: "news is anything timely that can be made interesting and significant to readers in respect to their personal affairs or their relation to society." This definition places the emphasis on the judgment of the editors. In nearly every case the publicity officer will find it advantageous to consult with the editor who handles his copy.

The mechanics of writing a news story are learned best by actually writing them. A few hints will be useful; but there is no substitute for practice.

Start with the single paragraph story. The paragraph writing habit is basic in news writing and the young reporter, the city editor, and the publisher all consider the paragraph the backbone of news writing.

The single paragraph story is complete in itself and includes all the data necessary for a full understanding of the story. When all the essential data are included in the paragraph it will answer one or more of the questions: What? Who? Where? Why? How? When?

Some suggestions on the actual writing may be helpful. The diction should be simple, clear, and free from unusual words. Syntax should be as simple as possible. Avoid long and unusual words in writing on a commonplace subject. Verbs should be of one syllable, strong and as far as possible denote action; Anglo-Saxon verbs are best. Sentences should be short. The pardonable exception is the lead sentence because it frequently summarizes the entire story. The limit should be thirty words with sentences of sixteen to twenty words much preferred.

Paragraphs of 25 to 30 words are preferred. In news stories, the best paragraphs contain two or three short sentences.

The publicity officer has a job that outwardly seems to have much freedom, but in reality it is very exacting. To do this job successfully is not too difficult for the average officer if he will tackle it with the right spirit. He should be relentless in his search for news—humble in his ignorance—keen in his perception, and alive to his opportunity for inducing mutual respect and confidence between the public and the service.

Target Practice of Battery "F", 59th C.A.

BY CAPTAIN VICTOR G. SCHMIDT, C.A.C.

BATTERY "F," 59th Coast Artillery, manning a 12-inch gun, fired its annual target practice on March 11, 1936, at Fort Mills, P. I. This practice deserves mention more because of the range and the speed of the target than on account of the unprecedented score. Firing at an average range of 22,000 yards, at a target towed by a destroyer making a speed of 26 miles per hour, 6 hits were made from 14 shots.

No doubt the Gods had us by the hand, perhaps both hands, but the Gods usually help those who help themselves. We helped the Gods to be good to us by taking advantage of training methods developed through the experiences and mistakes made in the past; because of this we are now able to fire with accuracy at ranges which would have been considered fantastic a score of years ago.

Preparation for this practice really began during the indoor training season. With a 50% turnover, and only

the plotter, one observer, and the gun commander remaining of the key men, each man in the battery was required to take the course of instruction for both second and first class gunners. Specialized instruction was given in accordance with a man's aptitude as shown by his school records. For example, if a man attained a high score as a second class gunner and a lower score in the first class gunner's subjects, it was concluded that his inclinations were along mechanical lines rather than in the use of range finding equipment. This simplified the selection of personnel for particular duties; also it had the advantage of making all the men familiar with the work of each member of the team.

The training of gun pointers, observers, and spotters is always hampered by the paucity of tracking missions. This difficulty was minimized by the requirement that each battery observe and spot the subcaliber and service

practice of other batteries of the harbor defense when within their field of view.

This training proved its value. When tracking missions were not available "dry runs" were made of hypothetical courses. Each drill was carefully analyzed and mistakes immediately brought to the attention of the responsible personnel, generally at a critique with all of the battery present. The effects of an error made by one man on the other members of the team was pointed out and each man was impressed with the importance of his work. A competitive spirit was developed and personnel errors became few and far between. Each man had to know what to do and how to do it.

The following minor details of training received special attention:

(1) Daily messages were studied and the constant error tabulated. If the plotting room deflection stripped of all personnel errors and angle of travel was more than one probable error, it was assumed that the ballistic wind as given in the daily message was incorrect. The correct wind was then calculated and the difference between this and the ballistic wind as furnished the battery was considered to be an error. Correction for drift was ignored. A constant error of the plotter in reading angular travel was checked against the B.C. observer's and the gun pointer's readings.

(2) With the target traveling from right to left the gun pointer was instructed to make a heavy correction for any splash over and to the left, or short and to the right; this for the reason that deviations left and right would have been greater had the projectile struck on or near the tug-target line. For the same reason, full values were not taken for a splash short and to the left, or over and to the right, since these splashes would have been closer to the target if they had occurred on or near the tug-target line. A line splash over was corrected for lightly, while a line splash short was regarded as being slightly to the right.

(3) The necessity for uniform density of loading was impressed on the ramming detail. During drills all imaginable mishaps were simulated; particularly misfires, failure of electric power, and obscuration of the target from base end stations or the battery. Each man was familiar with all safety regulations and knew what to do in case of emergency. An old friend, TR 435-220 (now obsolete), was called into play to assist in the preparation of the battery for firing. Much valuable help was obtained from the reminder list and it seems a pity that it should have gone into the discard.

Since the target's speed was 12.4 yards per second, hereafter high speed holds no terror for this battery. Correction was made by the magnitude method after the 4th,

8th, and 12th shots. The range officer was instructed to make a full correction on the first shot in the event that this fell four or more probable errors from the target. This precaution proved to be unnecessary for the first shot fell within the four probable error zone over or short. There was no record of the powder performance, therefore the initial muzzle velocity was furnished by the Ordnance Department. After the initial deflection was sent to the gun pointer, the range section was directed not to continue to send deflection but to furnish corrected azimuths. Inasmuch as the gun pointer had been trained to jump splashes, any deflection sent after the first shot was superfluous, merely increasing the work and adding unnecessary conversation. In the event the target should become obscured from the gun, corrected azimuths were available so that firing by Case III could be started immediately.

Arrangement had been made and the details carefully worked out so that the battery could fire by either Case II or Case III. Data could be sent to the gun by either the horizontal or vertical base system of position finding from either of the stations, a precaution which proved to be unnecessary as all matériel functioned perfectly. Six hits were obtained, one broadside and five bow-on. A 30-second observing interval was used; however, because the time of flight was approximately 45 seconds, a one-minute firing interval was ordered. The entire battery personnel manifested the keenest interest and enthusiasm. Preparation as well as target practice was not regarded as work; it was sport played in a sportsmanlike manner.

The target practice was characterized by:

- (1) Excellent team work.
- (2) No personnel errors.
- (3) No malfunctioning of matériel.
- (4) Average spotting error less than the least graduation on the range drum.
- (5) Small dispersion, indicating a uniform density of loading.
- (6) All record shots were hits for deflection.

Of course the *pièce de résistance* of any target practice is the score, hence we have saved this for the last:

A	150.0
B	94.4
C	21.2
D	0.0
E	8.0
R	236.0
Total	509.6

We are anxiously awaiting to see if any other battery can equal or exceed this record.

NEWS AND COMMENT

The United States Coast Artillery Association



"The purpose of the Association shall be to promote the efficiency of the Coast Artillery Corps by maintaining its standards and traditions, by disseminating professional knowledge, by inspiring greater effort towards the improvement of matériel and methods of training, and by fostering mutual understanding, respect and coöperation among all arms, branches and components of the Regular Army, National Guard, Organized Reserve and Reserve Officers' Training Corps."

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And Still They Come

PARAPHRASING Uncle Ezra's broadcast, we cannot avoid "a final toot on the tooter." This one presents a new slant on the value of the JOURNAL, therefore we pass it along for the possible enlightenment of other Reserve officers:

"The Editor
Coast Artillery Journal

"I certainly appreciate your continuous subscription policy but that you should have such a policy is not surprising in view of the up-to-date attitude you show in the JOURNAL itself. I find the JOURNAL of great value in helping me, a Reserve officer, to keep up with progress, thought, and changes in the branch of the service in which I hold a commission. I have also found it of assistance as supplementary reading in the extension school courses."

Major, CA-Res."

New Cover Design

WITH this issue the COAST ARTILLERY JOURNAL makes its appearance in a new cover. The old dress has been in use for nearly six years (a long time, considering the rapidity with which styles change), therefore it was considered that the JOURNAL should be treated to some new, up-to-date clothing.

The old cover lacked flexibility; it was designed to accommodate a photograph, which invariably has the longest dimension vertically. So long as a portrait was used no trouble resulted, but the space did not lend itself to pictures where the longest dimension was horizontal. Principally for this reason it was decided to adopt a more flexible design and at the same time to get in step with the modern trend and latest styles in magazine covers. The new cover will permit of the use of three different arrangements, depending upon the kind of illustration used; therefore, the readers should not be surprised if each succeeding issue presents a new, or at least a different, cover. This flexibility will be a boon to the editor. We regret to discard the old clothing but we feel that the readers will welcome the change and we hope that the new "window dressing" will create a desire to sample the goods within.

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Credit Where Credit is Due

THE March-April issue of the JOURNAL announced the award of the Association trophies to organizations of the Regular Army, National Guard and Organized Reserve. The 59th C.A. (HD) Corregidor, P. I., was the winner in the Regular Army. Delay incident to the mails made it necessary to prepare a short write-up on this award without reference to anyone then serving with the regiment. The names of the battery commanders were taken from the best available information in the office of the Chief of Coast Artillery. Naturally these records are "old and musty" by the time they reach the War Department. It now develops that Captain R. E. Bates should have been shown as commanding officer of Battery "E" in place of Captain P. F. Biehl and that Captain Raymond Stone, Jr., should have been shown as commanding officer of Battery "G" in place of Lieutenant J. G. Reynolds. We are very glad to correct this error in order to give credit to the proper officers and to emphasize that no slight was intended. The error is due entirely to the delay incident to distance and the slowness of mail service. Colonel Allen Kimberly was the commanding officer of the 59th during the 1935 target practice season.



Lieutenant Colonel Fred M. Green

Meet the New Editor

UNDoubtedly the readers of the JOURNAL will be interested in knowing something about the qualifications of the new pilot who, on September 1, will take over the helm and steer the JOURNAL upon a none too pacific sea, filled with uncharted financial rocks and subject to the cross currents of conflicting interests.

At this time it is our pleasure to introduce the new Editor, Lieutenant Colonel Fred M. Green, C.A.C.—not that he needs any introduction, for he is well and favorably known to the majority of the older officers of the Corps, but the junior officers and those of the civilian components will be interested in knowing something about his qualifications for this assignment.

At the risk of being accused of making an overstatement of fact we have no hesitation in saying that a better choice for this assignment could not have been made. Colonel Green is far from being a novice at the game. He has contributed many worthwhile articles to the JOURNAL. His writings are characterized by smoothness of diction, exactness of statement and an uncanny ability in the selection of words accompanied by an unusually extensive vocabulary. His literary attainments are of the highest order. In the field of prose he is entirely at home, also he frequently indulges his muse and is a poet of considerable ability.

Combined with his literary attainments goes a knowledge of the technique and tactics of the Coast Artillery

Corps which has won for him deserved recognition as an outstanding Coast Artilleryman. He has filled many important positions at the fountain head of the Coast Artillery Corps, including a detail as instructor in the School, Director of the Department of Artillery and twice a member of the Coast Artillery Board.

By referring to the old reliable A.R. we find that Massachusetts is the state of his nativity, and that he graduated as a bachelor of science from the Massachusetts Institute of Technology in June, 1909. Later he took a competitive examination and was commissioned a Second Lieutenant of Coast Artillery, in September 1910. Passing through the several grades he was promoted Lieutenant Colonel in August, 1935. Colonel Green is an honor graduate of the Coast Artillery School (1916), a graduate of the Advanced Course, Coast Artillery School (1924), the Command and General Staff School (1925), and is carried on the General Staff Corps eligible list. Prior to his detail as a member of the Coast Artillery Board he was on duty as instructor, Massachusetts National Guard, where his unflinching courtesy, high professional attainments and sympathetic attitude endeared him to all those with whom he came in contact.

It is with a feeling of satisfaction, akin to exultation, that we surrender the editorial chair to a successor who is so eminently qualified for this duty. The chair is not an easy one and the desk carries with it an overload of trouble. No wind blows that does not carry with it portents of danger. An editor should possess some sixth sense which will warn him in time to avoid the pitfalls which beset his path no matter how angel-like his tread. It should be remembered that he is required to cater to the literary and professional tastes of a diversified clientele. The intellectual feast he so painstakingly prepares should contain food for all and sundry. He must be continuously searching for ways and means to increase the number of subscribers and, as a corollary of this, he must have finesse and patience in his efforts to extract three dollars from reluctant hands. All this and more he must do without giving offense or stepping on the most sensitive toes. In addition to being an editor he must be a promoter, a business executive, a collection agency, a financial wizard, an advertising expert and a friend and counselor to those who seek advice. His office is expected to be a clearing house of information on all things military.

The qualities necessary to accomplish these things are possessed by Colonel Green in a superlative degree. Under his guidance we believe that the JOURNAL will reach new heights of literary merit and service to the Corps. We wish for him the same loyal support and cooperation which has been tendered in generous measure to the retiring editor. If during my tenure of office the JOURNAL has attained any degree of success it is due in a very large measure to the assistance, interest and cooperation manifested by our loyal friends and supporters. To these we due obeisance make and we ask that they continue their fealty to our successor. With it he will not fail.

Changes in the Chief's Office

WITH ten officers allotted to the office of the Chief of Coast Artillery and a tour of duty not to exceed four years in Washington, it is to be expected that the annual turnover will approximate an average of three officers per year. By a combination of circumstances the turnover at this time is double the expected figure. All sections of the office share in the change.

Perhaps the change of greatest interest to the majority of the officers is in the personnel section. For the past three years this section has functioned under the guidance of Lieutenant Colonel R. T. Pendleton. His has been a difficult (if not impossible) task, that of trying to please everyone. To his desk comes a never-ending parade of requests for special consideration or preferential assignment, combined with much information of a peculiarly personal character, explaining why it is necessary for the writer to be sent to a particular station, or why the Mrs. cannot be moved at present. The personnel officer must have tact and finesse to an unusual degree. He must be able to say "No" and at the same time convey the impression that he is conferring a favor. He must be able to look into the future and visualize (months in advance) the conditions affecting personnel. At the same time he must be able to meet sudden and unexpected demands for officers to fill special assignments. All these qualities and more Colonel Pendleton possesses to a marked degree.

His successor will be Major Clare H. Armstrong, who recently completed the course of instruction at the Command and General Staff School. Major Armstrong brings to his new assignment a wealth of experience combined with exceptional energy and initiative.

The matériel and finance section will experience a two-thirds turnover of personnel. Lieutenant Colonel O. L. Spiller is leaving at the end of a return engagement in the Chief's office. It will be recalled that Colonel Spiller organized the 61st C.A. (AA) at Fort Monroe, shortly after the World War. This organization was used for much experimental work connected with the development of antiaircraft artillery. Later he was the Coast Artillery representative at Aberdeen Proving Grounds, where he had much to do with the test and development of all classes of artillery matériel. This, added to more than seven years experience in the matériel and finance section qualifies Colonel Spiller as an expert on antiaircraft subjects. The fact that he is completing his second tour in the Chief's office indicates his outstanding qualifications and is a suitable testimonial to his ability. He has been handling questions pertaining to the design and distribution of matériel and the many side issues connected therewith. These duties have necessitated the closest possible liaison with the Ordnance Department for the reason that it is necessary to be fully informed as to probable changes in matériel, probable future develop-

ments and the rate of production. Colonel Spiller's experience, his fund of information and his prevision have made his services especially valuable.

Colonel Spiller will surrender his desk to Major H. B. Holmes, Jr., who has recently completed the course of instruction at the Army's highest institution of learning. Major Holmes' experience, both in garrisons and as an instructor at the Coast Artillery School, provides the background and training which will enable him to carry on the work so ably handled by Colonel Spiller.

Also to the matériel and finance section will go Major S. L. McCroskey as a replacement for Major B. L. Milburn, the latter having been detailed as a student at the Army War College for the next year. Major McCroskey comes from the Command and General Staff School, having been a member of the two-year class. Prior to his detail to Leavenworth he served as an instructor in the Coast Artillery School and a member of the Coast Artillery Board. These details gave him excellent training and experience for the important duty to which he has been assigned.

For several years the affairs of the plans and project section have been handled by Colonel George A. Wildrick, now en route to Hawaii. This section deals principally with projects for the improvement of the defensive measures and installations of the harbor defenses, especially in coordinating these with the defensive plans for sectors and sub-sectors; a most painstaking and exacting assignment. This duty will devolve upon the capable shoulders of Lieutenant Colonel John L. Homer. Colonel Homer has recently completed the course of instruction at the Army Industrial College, being the only Coast Artillery representative in the class of 1936. We are confident that he will manifest in his new duties the sound judgment and initiative that has characterized his service.

The organization and training section will lose the services of Lieutenant Colonel Robert M. Perkins, who goes to the War Plans Division of the General Staff. To Colonel Perkins belongs the distinction of being called to other duties after a period of only one year in the Chief's office. In this case the request of the General Staff could not be denied. Colonel Perkins' desk and duties will be taken over by Major W. H. Warren, who, like two others of the newly assigned officers, comes from the Command and General Staff School; also, like most of the others, Major Warren has served a detail as an instructor in the Coast Artillery School, being especially charged with the preparation of many of the special texts now used in extension school work.

The other change involves the editor of the COAST ARTILLERY JOURNAL; this has been commented upon elsewhere.

The JOURNAL desires to take this opportunity to thank the outgoing officers for their helpful suggestions, interest and coöperation and to wish the incoming officers a most pleasant tour of duty in the nation's capital.

One Journal Not Enough

FROM the Headquarters of the 265th C.A. (HD) Florida National Guard, comes a choice bit of information which we believe reacts to the benefit of a second lieutenant and incidentally to the JOURNAL. It seems that the Headquarters and Staff of the 1st Battalion consists of two officers, a major and a second lieutenant. Heretofore one copy of the JOURNAL had been doing double duty but these two officers could not agree on which one was to have "first crack at it." We strongly suspect that R.H.I.P. came into play and that the major asserted his prerogative. Another subscription entered in the name of the lieutenant has corrected this condition, and peace and harmony now prevails in the Battalion Headquarters, which incidentally boasts of 100% subscribers.

* * *

School of Instruction for National Guard

By Major A. A. Allen, C.A.C.

AS an experiment and innovation Brigadier General E. M. Stayton, commanding the Missouri National Guard, organized a school of instruction at Camp Clark, Mo. The school was in operation from June 15 to 20 (inclusive) with approximately 100 lieutenants in attendance. The school staff was drawn from the Regular Army instructors and those officers of the National Guard who have recently graduated from service schools.

The purpose of this school was to give the junior officers coordinated and supervised instruction in the duties which they will be required to perform during the two weeks annual encampment and to enable them to better impart instruction to the enlisted personnel. The students took the work seriously and realized that it was an unusual opportunity to better prepare themselves as leaders and instructors.

The school day began at 7:30 A.M. and ended at 9:00 P.M., the evening session being devoted to showing training films. Although the hours were long, many students asked for additional time in order that they might review the work covered during the day.

The subjects taught in the school included basic infantry training, riot duty and map reading for all officers. For the antiaircraft artillery officers, specialized instruction was given in the use of the Lewis charts, preparation for antiaircraft fire, trial shot problems, analysis of target practice reports and instruction on machine gun firing. While this school was somewhat in the nature of an experiment it fully demonstrated its value and the results more than justified the effort. Extension school courses are excellent but they do not take the place of personal contact and personal instruction when assistance is needed to untangle some difficult problem. It is hoped that a school similar to this will become an established custom in the State of Missouri and that it will prove to be an inspiration to other states.

Sacramento Chapter Among the Most Active

INFORMATION received from the Secretary-Treasurer of the Sacramento Chapter, Coast Artillery Association, indicates that this live wire organization is blazing a trail which other chapters should follow. The activities cover a wide field, including social and fraternal gatherings, assisting in the promotion of civic enterprises, as well as group schools, conferences, lectures, etc. On May 2, the chapter sponsored a dinner dance at the Twin Gardens night club; a most enjoyable time was had by all.

Each year Sacramento stages a Fourth of July celebration. Naturally this takes on a military flavor because it is participated in by detachments from the Army, Navy and Marine Corps; Military Order of the World War, the R.O.T.C. units of the several high schools and many other patriotic and civil organizations. The problems connected with organizing a parade of this magnitude involve time schedules, march orders, transportation schedules, traffic control, providing messing facilities for visiting troops, concentration of troops and other details which must be worked out in advance in order to insure the smooth functioning and success of the celebration.

Lieutenant R. N. Hicks, guiding spirit of the Sacramento Chapter, is Chairman of the committee on arrangements. He has hit upon a novel and effective scheme for giving both practical and theoretical instructions to the Coast Artillery officers of the Sacramento Chapter. To each of these has been assigned the duty of working out the details connected with some one of the problems above mentioned. In addition each will be given a definite mission such as:

- Liaison officers of Marine and Navy units;
- Officers in charge of transportation;
- Military police officers for the day;
- Safety officers;
- Reviewing stand officers; and
- Division marshals of the various elements.

Each official will be designated by an appropriate badge and will function under the Chairman of the parade committee. This plan affords much valuable training and experience.

This year Brigadier General Sherwood Cheney, commanding the IX C. A. District will be the reviewing officer. With him will be Brigadier General H. H. Morehead, Adjutant General of California, Colonel H. E. Cloke, Commanding the Harbor Defenses of San Francisco and Major James C. Bates of the 6th C.A. Colonel R. E. Mittelstaedt will be Grand Marshal of the parade.

The Sacramento Chapter is sponsoring the high school, R.O.T.C. unit by putting up trophies to be awarded in a number of different competitions and helps in filling the quota of C.M.T.C. enrollees from Sacramento County and City.

There are comparatively few Coast Artillery officers residing in Sacramento but these have made up in interest and initiative what they have lacked in number with the result that the Chapter has set a fast tempo and is one of the most active in the Association.

COAST ARTILLERY ACTIVITIES

Office of Chief of Coast Artillery

Chief of Coast Artillery
MAJOR GENERAL A. H. SUNDERLAND

Executive
COLONEL HENRY T. BURGIN

Personnel Section
MAJOR CLARE H. ARMSTRONG

Matériel and Finance Section
MAJOR C. W. BUNDY
MAJOR H. B. HOLMES
MAJOR S. L. MCCROSKEY

Organization and Training Section
LIEUT. COL. E. E. BENNETT
LIEUT. COL. F. M. GREEN
LIEUT. COL. C. M. S. SKENE
MAJOR W. H. WARREN

Plans and Projects Section
LIEUT. COL. JOHN L. HOMER

Fort Monroe News Letter

BRIGADIER GENERAL JOS. P. TRACY, U. S. Army, *Commanding*

COLONEL HORACE F. SPURGIN
Commanding Harbor Defenses of Chesapeake Bay

LIEUTENANT COLONEL ROBERT C. GARRETT
Commanding 3d Bn., 52d C.A.

LIEUTENANT COLONEL FRANK S. CLARK
Commanding 1st Bn., 2d C.A.

MAJOR OLIVER B. BUCHER
Commanding 1st Bn., 51st C.A.

By Major O. B. Bucher, C.A.C.

THE big event since our last letter was the visit of the Chief of Coast Artillery on the occasion of the graduation of 36 officers and 67 enlisted men of the 1936 class, Coast Artillery School.

General Sunderland was received with a guard of honor from the 2d Coast Artillery commanded by Lieut. Colonel F. S. Clark. Immediately thereafter he was escorted to the Coast Artillery School, where he addressed the graduating class.

The following extracts from his address, as reported in the *Norfolk Pilot*, will be of interest:

"The Coast Artillery Corps is not doing as good shooting as it is capable of doing," Major General A. H. Sunderland, Chief of the Coast Artillery, told the members of the graduating classes at the commencement exercises held in the school auditorium. "Good shooting depends on training," the Chief said and he told the graduates and the officers of the post that this feature would be stressed while he remained at the head of the Corps, adding that, "Too much attention is being paid to the housekeeping details."

General Sunderland, who has spent more than 30 years in school duty, as he expressed it, "behind and in front of a desk," spoke in terms of real intimacy with the members of the graduating class. Many of the 30 years that he mentioned were spent at Fort Monroe, during which time he occupied almost every position on the post.

General Sunderland emphasized the fact that new devices were being introduced constantly and urged all officers to keep abreast of developments, adding that there was nothing the matter with the equipment of the Coast Artillery. He expressed the opinion that probably we have the best antiaircraft matériel in the world. It was made plain that every officer and enlisted specialist should be wide awake and alert and that in the performance of their work they should not indulge in destructive criticism but should bend their efforts to the improvement of the service and give every device and suggestion a thorough trial before condemning it.

Speaking of assignments to duty and stations General Sunderland urged the officers "to take it as it comes." Here he interposed the single reference to the women of

the Coast Artillery, pointing out how they could be helpful to their husbands in accepting cheerfully the duties assigned, even if this took them to localities that were not the most desirable. An officer must be prepared to go anywhere.

He especially complimented the work of the Enlisted Specialists Division and told of its importance in peace and war. "With new developments in antiaircraft gunnery, submarine mines, radio and engineering equipment constantly being made, the part the enlisted specialist plays becomes more important each day."

The introductory address was made by the Commandant, Brigadier General Joseph P. Tracy, who stated that the set-up of the school during the past few years had been very satisfactory and would be continued. The opportunities and facilities of the school were ample, and he congratulated and thanked the graduating officers and the enlisted specialists for their cooperation, interest and enthusiasm. . . . The presentation of diplomas to officers and certificates of proficiency to the enlisted specialists was made by General Sunderland with words of congratulation to each. Due to his recent residence on the post he was acquainted personally with nearly every member. A tribute to his popularity was attested by the fact that the auditorium was packed to capacity.

General and Mrs. Sunderland were tendered a reception and dance by the garrison at the Beach Club; in addition to the entire officer personnel and their families, many friends from the Peninsula were present to greet them.

The Beach Club opened with a bang in the latter part of May. On any warm afternoon, and many evenings, the pool is filled with bathers. The new picnic area has been improved by the addition of new equipment. This area has become so popular that reservation now has to be made in order to accommodate the picnic parties. We believe that the Westchester Country Club has nothing on us as far as this type of entertainment is concerned.

Governor Peery of Virginia visited the post on May 11th for the purpose of opening the Convention of the Oyster Growers of America at the Chamberlin Hotel. The honors accorded Governor Peery were a 19-gun salute and an escort of honor commanded by Lieut. Colonel R. C. Garrett, 52d Coast Artillery.

The record made by the students enrolled in the III Corps Area West Point Preparatory School at Fort Monroe is an enviable one. After the mid-term examinations there were 29 men remaining. Of this number 13 were appointed and entered West Point on July 1. It is interesting to note that of the seven men authorized by the III Corps Area to enter the school all seven passed the final examination and were appointed. In the summer of 1935 approximately 90 men took the examinations for entrance to the Fort Monroe Preparatory School. It is expected that 120 men will be authorized to take the entrance

examination this summer. Of this number 40 will be selected to pursue the course. The instructors, Lieut. A. A. Koscielniak; Lieut. P. S. Peca; Lieut. D. B. Rout, and Lieut. H. W. Ebel, are to be congratulated for the highly successful results attained.

On June 20th the curtain was rung up on the annual Fort Monroe Horse Show, held in the ring near the Liberty Theatre. Box seats were constructed along Pratt Road and a section of bleachers was placed just west of the road. Major Otto B. Trigg, our Cavalry instructor, has accomplished the seemingly impossible in growing grass in this ring. Many other improvements in the layout are due to his forethought, interest, and energy. The garrison is appreciative of Major Trigg's efficient handling of the riding classes. He was assisted in handling the show by Major F. E. Edgecomb, C.A.C., Master of the Paddock, Major R. N. Mackin, C.A.C., as announcer, and Major E. L. Poland, Inf., as Master of the Ring.

The Hampton Horse Show was held in May. A number of post people were entered in the various events and carried off their full share of the "prize money." From a Monroe standpoint the Hampton Show was marred somewhat by an accident to Capt. Armand Hopkins, C.A.C. His horse stumbled at one of the jumps, throwing Capt. Hopkins and breaking his left leg at the ankle. Captain Hopkins is now recuperating at Walter Reed Hospital, and reports indicate that he will be back for duty about August 1.

Batteries "A" and "B," 51st C.A., conducted their annual target practices with 155-mm. guns at Fort Story, on June 9. The twenty-first shot of Battery "B's" practice struck the center pole, carrying away the flag and upper part of the pyramidal target. The analysis showed 8 broadside and 4 bow-on hits with a score of 95.2. Battery "A" fired at a range slightly over 12,000 yards and obtained 4 broadside and 2 bow-on hits, which gave them a score of 92.8. Both batteries hope to be rated excellent. Battery "A" was officered entirely by graduates of the Class of 1935, U.S.M.A., they conducted the practice in an exceptionally fine manner.

On the same date, Battery "F," 52d C.A., fired 8" RR guns. While the score will not be as great as the 51st C.A. batteries, the practice appeared to be very satisfactory. During the firing of the three practices there was no matériel failure nor relays.

Battery "D," 52d C.A., 12" RR Mortars, fired their annual target practice on June 25 resulting in 11 hits. This battery was also officered entirely by graduates of the Class of 1935, U.S.M.A.

Battery "A," 2d C.A., fired a service mine practice for the Coast Artillery School officers. Nineteen mines were planted, five of them loaded. The towed target was destroyed on the second course. The news reel people were thrilled over their "shots" of this practice.

Hawaiian Separate Coast Artillery Brigade

News Letter

BRIGADE COMMANDER, BRIGADIER GENERAL ROBERT S. ABERNETHY

CHIEF OF STAFF, COLONEL BENJAMIN H. L. WILLIAMS, C.A.C.

S-1, LIEUTENANT COLONEL E. S. DESOBRY, A. G. D.

S-2 MAJOR JOHN T. LEWIS, C.A.C.

S-3, LIEUTENANT COLONEL RALPH E. HAINES, C.A.C.

S-4, LIEUTENANT COLONEL B. S. DUROIS, C.A.C.

Harbor Defenses of Honolulu
16th C.A.

COLONEL GEO. L. WERTENBAKER, *Commanding*

Harbor Defenses of Pearl Harbor
15th C.A.

COLONEL EARL BISCOE, *Commanding*

64th Coast Artillery

COLONEL WILLIS G. PEACE, *Commanding*

By Lieutenant William M. Vestal, C.A.C.

THE Department Commander, Major General Hugh A. Drum, gave all South Sector (Honolulu) posts and stations a thorough going-over late in May. As far as the Coast Artillery Brigade was concerned, it had been brushing up, figuratively and literally, for about a month. Fort Shafter was inspected May 18th, Fort Kamehameha May 20th, and the Harbor Defenses of Honolulu May 22d. All posts came through with flying colors. During the field phase of the inspection, special comments were made on a miniature set-up of a complete fire control system by Kam's battalion of the 55th C.A. (TD), the thorough preparation of the emplacement of Battery Closson (Battery "B," 15th C.A.) for prolonged field service, the excellent appearance of the transportation of the 64th C.A. (AA), and the minute perfection of a "pup tent" camp by Battery "D," 16th C.A.

Consideration of the individual training of the soldier, condition of armament and motor vehicles, general appearance of barracks and grounds, as well as a complete administrative inspection, made General Drum's visits the occasion for intensive preparation. At each post the officers and enlisted men, whose service had been outstanding during the past year, were cited in orders at the post review given for General Drum. These citations were a splendid award to many for their energetic and conscientious efforts.



The Honorable Frank J. Murphy, U. S. High Commissioner to the Philippines, and Major General Hugh A. Drum inspect the 64th C.A. (AA).

HARBOR DEFENSES OF HONOLULU

The primary assignment firings of the Brigade were concluded May 5th; by Battery "C," 16th C.A., firing 8" railway rifles at Fort Kamehameha. The antics of the T. I. system, furnished by a permanent installation, by going out of service eight times during the practice assisted in producing a score of 62.4. Just prior to this Battery "A," 16th C.A., Fort DeRussy, fired two ex-calibre practices with 155-mm. guns. Scores: 130.6 and 78.9.

BRIGADE PICNIC

On Memorial Day (May 30th) came the Brigade Picnic, at Fort Weaver. At least 150 members of the various Coast Artillery garrisons attended this outing. Colonel Biscoe had spent much time and labor in a complete renovation of the officers' beach. Permanent picnic tables provided plenty of space for lunch and a long line of beach chairs, of a very solid and permanent type, afforded parking space for those not inclined to gambol in the waves. The surf at Weaver, due to shifting sands, has become second only to Nanakuli. Two barrels of beer contributed by the officers' clubs afforded welcome libation.

Those desiring more varied exercises than swimming, indulged in volley-ball and the pleasant diversion of tossing damsels in a blanket. The entire day was such a success that another picnic probably will be held as soon as a reasonable excuse can be found.

The facilities of the beach make it possible for two families at the same time, to spend week ends, or extended leaves, with nearly all the comforts of home and probably minus some of the discomforts. A new paved road makes the beach as accessible from the direction of Honolulu as the usual means of boat and narrow-gauge "rail-jumper" from Fort Kam.

OVERS AND SHORTS

The Honorable Frank J. Murphy, United States High Commissioner to the Philippine Islands, was accorded honors by the 64th Coast Artillery, at Fort Shafter, Friday afternoon, May 29th. The Commissioner was enroute from the Orient to the mainland. Major General Drum received the review with the Commissioner, and a reception was held at his quarters after the formation.

The annual Department Maneuvers were held from June 15th to 30th. At the time of writing, information indicates that the two weeks' exercise will include a thorough test of the mobility and flexibility of the command. The meaning of the word "thorough" will be dwelt upon in our next letter.

The U.S.A.T. Republic, due July 1st, brings a Congressional Party. In their honor Coast Artillery organizations will stage a Brigade night review at Fort DeRussy. After several strenuous days looking over the various posts and getting a general idea of the defenses of the island, they will be tendered an "Aloha" review by the Hawaiian Division and the 64th Coast Artillery at Schofield Barracks on July 6th.

ATHLETICS

The Hawaiian Department individual track and field championships were decided on the new track at Fort DeRussy April 25th. To climax four 1936 boxing championships, the Sector entrants copped seven individual track and field championships and one of the two relays, to break even with Schofield Barracks. The outstanding efforts for the day were contributed by Private Stanley S. Sadaj, H. D. Honolulu, in the mile run, where he set a new Department record of 4:34.6.

The combined Army (Schofield and Sector) teams ran away with both the annual Rainbow Relays and A.A.U. Meets. In the Rainbow Relays, held at Fort DeRussy, Lieutenant Richard Moorman, Fort Kamehameha, set a new Island record of 47 feet 9½ inches for the "shot-put," while Private Sadaj, H. D. Honolulu, and Sergeant Harry Beamer, Luke Field, together with two Schofield runners established a new Island record for the two-mile relay of 8 minutes, 22.5 seconds. On May 9th, more records fell in the A.A.U. Meet, held for the first time at Stoneman Field, Schofield Barracks. Sadaj set a new record of 4:32.2 for the mile, and the Army mile-relay team contributed another record of 3:27.2.

Corregidor News Letter

BRIGADIER GENERAL JOHN W. GULICK, *Commanding*

COLONEL WILLIAM S. BOWEN, *C.A.C., Executive*

59th Coast Artillery

COLONEL PAUL D. BUNKER

60th Coast Artillery (AA)

COLONEL ALLEN KIMBERLY

91st Coast Artillery (PS)

LIEUTENANT COLONEL CLAIR W. BAIRD

92d Coast Artillery (PS)

MAJOR REINOLD MELBERG

By Lieutenant Colonel Oscar C. Warner, C.A.C.



Coast Artillery Association Trophy being presented by General John W. Gulick to Colonel Allen Kimberly, who commanded the 59th during the 1935 target practice season. Colonel P. D. Bunker, present commanding officer of the 59th, on the right.

THE gun battalion, Batteries B, C and D, 60th Coast Artillery, under Major Lewis J. Bowler, completed its target practices in April with excellent results. The 4th Composite Group from Nicholas Field furnished the towing missions. A string of white, cloud-like patches across the sky, each puff originating right at the target is a thrilling sight. The 60th is a real "up and doing" outfit, ready for service at any time, with plenty of pep and excellent discipline. Note the TORI gate and other ornamentation about the gun and machine gun parks. A little touch of Japanese influence, perhaps a portent of what may come.

The seacoast batteries firing anti-aircraft guns as additional assignment did well in the April practices. They are to be congratulated even though their scores may not reach the magnitude of the 60th.

COAST ARTILLERY ASSOCIATION TROPHY

On June 4th, General Gulick presented the Coast Artillery Association Trophy to Colonel Allen Kimberly, the commanding officer of the 59th Coast Artillery during the 1935 target practice season when the trophy was won. A large group of visiting officers from Fort McKinley witnessed the ceremony which was followed by a review of all the troops of the garrison.



TOP: Firing point of the 60th C.A. (AA). Note TORI Gates.

CENTER: High speed target designed for a speed of 22 knots per hour.

BOTTOM: Side view of nozzle for high speed target.

TRANSPORTS

The July transport will take back to the United States an unusually large number of officers and their families, most of whom are now in China on leave. Both the July and November transports will go through to New York City.

SUBMARINE MINING

Batteries A and G, 91st Coast Artillery (PS), under the tutelage of Lieutenant Colonel Gooding Packard, each turned in a perfect score in their mine practices. This command also knows how to protect its mines after planting, Battery A shooting a score of 81 with the 155-mm. guns, and Battery G, a score of 116 with 6-inch DC guns at a high speed target.

RECUPERATION

The first rain of the year, on May 29-30, broke an unusually long dry season. Colonel Bunker, Captain L. Vichules, Lieutenants T. B. White and Ostenberg spent the most of May on leave in China. A long list of officers spent from 10 to 30 days detached service at Camp John Hay, Baguio. Many of them took the mountain trip to Bontoc and Banaue where unsurpassed mountain scenery is the rule and rice terraces abound. These are considered by many to be among the wonders of the world. Almost all go to the Balatoc mine to see how new gold is extracted from the miserly rock. Officers return from Camp John Hay full of pep and renewed vigor but few talk about the low scores made on the Baguio golf course.

The mine planter Harrison, Captain S. Rubin commanding, made a trip to the Southern Island with the Department Commander and his party. Reports indicate that all enjoyed the cruise.

ATHLETICS

The inter-regimental base-ball series was opened on May 1st with General Gulick throwing the first ball. Under the tutelage of Lieutenant Ratcliffe the team representing the 91st C.A. (PS) defeated the American teams from the 59th and the 60th, winning three out of the four games. The 60th team, coached by Lieutenant Frank Ebey, ended in second place with two wins and two losses while the 59th held down the cellar position.

However, the Department Baseball Series played in Manila was a different story. In the American troop division, the 59th and 60th battled to a tie, leading the other contestants by at least two games. In the play-off the 59th took the 60th into camp to the tune of seven to nothing, thus clinching the Department title for the American troops and winning the coveted trophy.

With the advent of the rainy season, athletic activities are restricted to the gymnasium, with the bowling alleys holding the center of the stage. The officers division is represented by a team from each regiment and one from the Staff. Mrs. R. L. Williams, with the assistance of the Recreation Officer, organized a Ladies Bowling League. This is expected to keep the bowling enthusiasts busy during the morning hours.

Panama Canal Department News Letter

Department Artillery Officer
COLONEL LEWIS TURTLE, C.A.C.

Fort Amador
COLONEL EARLE D'A. PEARCE
4th C.A. (AA)

Fort Sherman
COLONEL WILLIAM M. COLVIN
1st C.A.

Fort Randolph
LIEUTENANT COLONEL JAMES S. DUSENBURY
1st C.A.

By Lieutenant Colonel W. C. Foote, C.A.C.

THE 4th Coast Artillery has completed all seacoast service practices for the 1936 season. Battery I (14-in. D.C. guns) fired at a range in excess of 17,000 yards; a number of hits were obtained but the score is not available at this writing. Battery D, Captain Vern Walbridge commanding, conducted its annual mine practice with a perfect score. Later the same organization obtained a score of approximately 166 with 155-mm. guns.

As this letter goes to press the 1st Coast Artillery is in the midst of its service practices. Battery C, firing 12-in. B.C. guns, turned in a score of approximately 176. Other batteries are in the midst of active preparations for the big event of the year.

After a nine-months' lay-off the Air Corps has resumed towing mission for antiaircraft firing. The 4th Coast Artillery is now engaging in preliminary gun practices for both day and night firing. Machine gun practices are the order of the day in both sectors. It is hoped that nothing will interrupt the towing missions until all antiaircraft firing is completed.

TRAINING TESTS

The Sector Commanders on each end of the Canal have recently completed their quarterly training test. General Rowell's inspection concluded with an Atlantic Sector review at France Field on June 27. On July 25 General Halstead will hold a farewell review of the Pacific Sector troops for Major General Lytle Brown, who sails for the States on July 29 preparatory to his retirement.

Notwithstanding the exacting seacoast artillery training schedule of the 4th Coast Artillery this organization has found the time and the energy to undertake a series of quarterly small-bore rifle matches. A suitable trophy will be awarded to the winning battery to retain until the next match, and if a battery should be fortunate enough to win this three times it will become the proud permanent possessor. In the first match the Service Battery turned in the remarkable score of 926 points out of a possible 1,000. Other batteries were close contenders, the lowest score being 821. Corporal M. H. Trumble,

Battery G, was the high scorer in the individual competition with 195 out of a possible 200. This is a further proof of the versatility of the Coast Artillery Corps although small arms firing is a side issue.

ATHLETICS

The 1936 field and track season ended with the track meet held at Fort Davis during the latter part of May. Again the Coast Artillery covered itself with glory, Fort Amador especially showing the most astonishing improvement. The Pacific Sector meet, while not primarily a contest between posts, developed considerable rivalry. The 33d Infantry, the 4th Coast Artillery and the Headquarters Company, Pacific Sector, were tied almost until the end, when the Infantry forged ahead with a three-point lead. The Department meet participated in by practically all units in the Canal Zone developed an unusual amount of enthusiasm and friendly competition. On the second day a special train was run from the Atlantic Sector bringing more than 1,000 rooters. Much to every one's surprise the meet ended in a draw between the opposing sectors. This made it necessary to pick the winner by the well-known method of tossing a coin. Major General Lytle Brown did the tossing and the representative of the Atlantic Sector called the turn, thus winning the department cup for 1936. In this meet Fort Amador won the "High Post" pennant and Corporal Cronick of Battery B was the "High Point Winner." To the 1st Coast Artillery went the pennant for winning the greatest number of points in the meet. Thus again this regiment proved the suitability of its motto "Primus inter Pares." The 4th Coast Artillery was runner-up, the final score being two points below the 1st C.A.

In the Department tennis championship matches the Coast Artillery was represented by Lieutenant G. W. Guinev in the officers' singles and by Captain H. E. Strickland and Lieutenant K. M. Briggs in the doubles. In the ladies matches Miss Jennie Grav Pearce, daughter of Colonel Earle D'A. Pearce, won the Pacific Sector's singles but later lost to Mrs. J. H. Houghton of France Field.

COAST ARTILLERY BOARD NOTES

Any individual, whether or not he is a member of the service, is invited to submit constructive suggestions relating to problems under study by the Coast Artillery Board, or to present any new problems that properly may be considered by the Board. Communications should be addressed to the President, Coast Artillery Board, Fort Monroe, Virginia.

THE COAST ARTILLERY BOARD

COLONEL WILLIAM E. SHEDD, JR., C.A.C., *President*
MAJOR CLARENCE E. COTTER, C.A.C.
MAJOR GORDON B. WELCH, Ord. Dept.
MAJOR ALVA F. ENGLEHART, C.A.C.

MAJOR STANLEY R. MICKELSEN, C.A.C.
MAJOR EUGENE T. CONWAY, C.A.C.
CAPTAIN HOBART HEWITT, C.A.C.
CAPTAIN WALTER J. WOLFE, C.A.C.

SECTION I

Projects Completed Since Last Issue of the Journal

PROJECT NO. 1039—DATA TRANSMISSION SYSTEM T-11.—This is an electrically-operated follow-the-pointer system for transmitting firing data from the plotting room to the guns of a fixed seacoast battery. Since adaptation to disappearing carriages involved some complications, the equipment sent to Fort Monroe was installed for test purposes at Battery Montgomery. Certain mechanical inaccuracies in this installation were discovered, but in general the operation of this equipment was very satisfactory. Pending the outcome of tests to be held in other harbor defenses, the Board has not recommended standardization of this device, but regards it as a promising development. Some minor modifications have been recommended for incorporation in future construction. The Board believes that in the issue of this equipment to the service, priority should be given to supplying major caliber long range batteries emplaced on barbette carriages. Because of the cost of the fabrication and installation of such data transmitters, their early application to less important batteries appears unlikely.

PROJECT NO. 1046—ANTI-AIRCRAFT MACHINE GUN FIRE CONTROL METHODS AND EQUIPMENT, 1936.—The conclusions and recommendations of the Board under this project would fill many pages of the JOURNAL. In brief, it may be said that the Board recommended discontinuation of further development of computing sights, and concentration upon two methods of fire control: viz., central control for long range targets, whenever time and circumstances permit the use of this method; and individual tracer control for all other situations. The results, obtained with three different types of caliber .50 machine gun, were presented in considerable detail. Certain elements of the equipment, such as ammunition chests, stabilizers, muzzle radiators, circulating pumps, and link chutes, were found unsatisfactory in certain respects; others, such as the lead computer designed by Major

Gordon B. Welch (and hence familiarly known as the "Welch Rabbit"), were found to offer considerable promise, and were recommended for further development. The T25E1 mount, with certain modifications, was recommended for limited procurement, with a view to an extended service test. The modification of existing M1 tripods, to adapt them, to use with central control, was suggested. Extensive comments were prepared on caliber .50 machine gun ammunition, on the accuracy life of caliber .50 machine gun barrels, on the redesign of sights and sight brackets for use in central control firing, on the use of telephone head sets for coaching gunners, on methods for flank spotting, on optical aids for use in connection with machine gun fire control, and upon means of illumination of machine gun targets at night. The Board recommended that machine gun batteries (primary assignment) of the Regular Army be equipped with central control devices as rapidly as funds will permit, and meanwhile that not less than four sets of central control equipment be procured immediately for extended service test in connection with the service test of the T25E1 mounts.

PROJECT NO. 1048—DEVICE FOR GREASING GUNS (BROWN).—This is a device for spreading a protective layer of grease, so as to cover the rifled portion of the bore of an artillery piece to a uniform depth. The device is dragged through the bore by a rope; by means of a floating piston, which bears against the lands of the rifling, pressure is applied to the rust preventive compound with which the device has been filled; the grease is thus extruded radially so as to protect completely the inner surfaces of the bore. The Board found that the operation of the device was much improved by certain modifications which facilitated the initial filling of the device with grease, and increased the radial pressure with which the grease was exuded; accordingly, it was recommended that four modified devices be manufactured and issued to selected harbor defenses for the purpose of service test. It is to be noted that by use of this device, the upper elements of the bore are greased as thoroughly

as the lower surfaces, and that fewer men are required than when greasing with a bore sponge—a major advantage to all caretaking detachments.

PROJECT NO. 1049—FIELD JACKETS.—The Board recommended modifications to the collar and zipper of this garment, and suggested pleating of the back to lessen the fullness of material without detracting from the freedom of movement of the wearer. Changes in the pockets, to render them more accessible, were also suggested. A garment of this character, especially when worn under the blue denim uniform, provides a practical and sensible costume for working on guns and motor vehicles during cool weather. The jacket is also suitable for wear as an outer garment, during periods of field service at a season when the warmth afforded by an olive drab shirt is inadequate. The Board accordingly recommended procurement of a supply of field jackets sufficient to equip a mobile unit of Coast Artillery stationed in a northern latitude, for the purpose of conducting a year's service test. It is believed that such a jacket will prove useful and popular within its proper field of use.

PROJECT NO. 1051—TIME INTERVAL APPARATUS, EE-85-T5 AND ASSOCIATED EQUIPMENT.—In the light of service tests, the Board reluctantly decided to recommend the return of this equipment for complete redesign of the mechanism proper, extensive changes in the line connector unit, and minor alterations in the local battery howler. Local battery howlers were found distinctly preferable to the receiver type howlers, in comparison with which they were tested. In the interests of simplification, the Board recommended a reduction in the variety of time intervals to be furnished; some of the troubles seemed to originate in over-elaboration in an effort to meet too great a diversity of demands.

PROJECT NO. 1054—TELEPHONE BOX, EE-91-T1.—This is a new type of telephone for fire control use at seacoast batteries. It is characterized by greater compactness and higher efficiency than the wall-type telephones now in use. During these tests, the performance of this equipment was generally excellent; it improves the efficiency of transmission by from 8 to 10%, and is freer from interference by extraneous sounds when used in a noisy place. Handsets and head and chest sets were provided for test; both of these, as well as the telephone box, were found satisfactory. A number of minor changes in details of construction have been recommended, but on the whole this equipment represents a marked advance over existing types, and its standardization (with certain minor modifications) has been recommended.

PROJECT NO. 1057—EXPERIMENTAL FLANNEL SHIRTS.—The test of these shirts, which are of serge weave and composed of 80% wool, and 20% cotton, has been completed. About seven months ago, the Board completed its tests of an all-wool worsted shirt, which proved a great improvement over the flannel shirt of World War issue. Reports from individuals who have worn both types of

experimental shirts indicate that a small majority consider the all-wool fabric (the shirt of the earlier test) to be superior to the 80% wool fabric in many respects, such as general appearance, quality of cloth, shade of olive drab, fastness of color, ability to keep its press, durability, and ability to withstand shrinkage when laundered. An almost equal number of wearers preferred the 80% wool fabric, and criticized the all-wool shirt for being too stiff, too hard, and apt to chafe the wearer's neck. Both fabrics shrink badly on being laundered, and a better method of laundering must be developed before any wool shirt will be found entirely satisfactory. The type of shirt tested has two good points which will be recommended for incorporation in all future design: a quilted collar, which holds its shape and presents a better appearance than a collar of either the one-piece or two-piece type; and the sizing of shirts in sleeve lengths as well as in neck measurement.

PROJECT NO. 1064—NIGHT GLASSES, T2 AND T3.—Two members of the Board observed the functioning of these binoculars at the recent joint exercises at Fort Belvoir. Glasses were mounted on an elevating yoke of the antiaircraft searchlight control station, for the purpose of facilitating the picking up and tracing of targets. Both types of glass appear to be excellent optical instruments. The T2 binocular is the type of glass now issued with M1934 antiaircraft searchlight control stations. In the binocular T3, the image is inverted; this caused some confusion in the minds of inexperienced operators, but this confusion tended to disappear with practice. The improved optical efficiency, which results from omitting the erecting elements from the optical system, was imperceptible under normal conditions, but would doubtless be evident under conditions of extremely poor visibility. The yoke mounting on the control station was of a design which caused extreme inconvenience to the operator at large angular heights; this suggested the substitution of an elbow telescope for the present binoculars. The Board has recommended test of a control station equipped with an elbow telescope, for comparison with the present arrangement.

SECTION II

Projects Under Consideration

PROJECT NO. 953—RADIO CONTROLLED HIGH SPEED TARGET.—Circumstances have prevented construction and installation of the gyroscopic control in the target boat this spring, so in order to accomplish what was possible with the means at hand, visibility tests have been conducted. The results to date have been satisfactory, but the tests are not yet completed. The installation of cork for emergency flotation is also in progress; this boat may be sunk by gun fire, but at least steps are being taken to prevent its loss should it accidentally be swamped in rough water. The present plan is to make the fullest possible use of this boat as a tracking target

during the summer training period; whether fire is to be directed at it this year will depend upon whether satisfactory operation can be obtained without waiting for the complete gyroscopic control installation.

PROJECT NO. 1055—PAINT PRIMERS FOR SEACOAST MATÉRIEL.—The armament which has been painted, over the primers in question, remains in such condition that, as yet, no discrimination between the paint primers is possible. It is probable that after the target practices this summer, some opinion may be formed as to how well each primer will endure the heat of firing.

PROJECT NO. 1056—SOUND POWERED TELEPHONES.—For the past few weeks, this equipment has been under service test at Fort Story by the troops of a 155-mm. gun battery, in connection with their annual training and target practice. Very favorable reports have been received, particularly in regard to elimination of all need for supplying batteries, or any other source of electrical power for operation. In the near future, tests will be conducted by the Coast Artillery Board to determine: the length of field wire and of fire control cable over which communication is practicable; whether the equipment will withstand the shock of heavy gun fire; and whether it is suitable for use with the diaphragm gas mask.

PROJECT NO. 1058—SPOTTER T5.—This device, as explained in the January-February issue of the JOURNAL, is to be inserted in the data transmission cable between the director and the guns. It is intended for use in cases where the director is either masked or is displaced to a considerable distance from the gun position. The spotter, set up near the guns, is provided with dials both for vertical and for lateral spotting. Corrections, due to vertical and lateral deviations as observed from the vicinity of the firing battery, can thus be set into the gun data for future rounds, irrespective of the position of the director. The principle involved is that of the electric differential. The tests have demonstrated that the accuracy and reliability of this equipment are satisfactory. The necessity for issuing this equipment depends upon whether and how often the director is to be concealed or displaced in actual service; the recommendations of the Board will naturally depend upon a decision on this controversial question.

PROJECT NO. 1059—DEPRESSION ANGLE INDICATOR, 1936.—This test covered instruments of two distinct types: one was a glorified pendulum clinometer, similar in principle to those used in field sketching; the other was a more complete instrument which measured not only the depression angle of the target, but also the bearing of the target from the observing airplane. In the latter instrument, depression angles were measured from an artificial vertical established by a level bubble. Azimuths were determined by a magnetic compass; this arrangement proved inconvenient because of local attraction and inertial effects, and during the test the compass was replaced by a turn-indicator which operated on the gyro-

scopic principle; considerable advantage resulted from this change. Comparison of the relative accuracy of the instruments as to range determination showed that there was little difference in precision between the two types; the level bubble seemed to give slightly better accuracy. The Board believes that further development is required; with material improvement in design, to afford greater convenience in operation. It appears probable that a considerable gain in precision would be attained by the substitution of gyroscopic references for vertical as well as horizontal measurement.

PROJECT NO. 1063—RADIO SET, SCR-194-T3.—This project occupies a unique status in the experience of the Coast Artillery Board: instead of having to find someone willing to test this equipment, it is more a question as to who shall be allowed to use it next! This little set has "sold itself" to everyone who has seen it work. After employment with antiaircraft searchlights, at seacoast target practices, and during work on the water by the mine battery, it was "taken for a ride" in June by a convoy operated by the Department of Enlisted Specialists. Further tests are to be conducted in connection with the various outdoor activities during the summer training period. The principal limitations upon the use of this equipment appear to be interference from other sets of similar character operating in the same vicinity, and the problem of supplying primary cells (or electric energy from some other source) to provide for continuous use over a considerable period of time.

PROJECT NO. 1065—FLASHLESS POWDERS FOR ANTI-AIRCRAFT GUNS.—Two lots of flashless powder, with a third lot of standard powder for purposes of comparison, are to be fired next fall under supervision of the Coast Artillery Board. The means adopted for suppressing the flash, generally operate to increase the amount of smoke emitted; the question naturally arises as to whether this increased smoke from the two experimental powder lots will occasion serious interference with fire control instruments, and whether it will add to the visibility of the battery from the air (or its conspicuousness in an aerial photograph) during day firing. Tests are being designed to obtain data on these two questions.

PROJECT NO. 1066—SLIP RINGS, ANTI-AIRCRAFT MOUNT.—Antiaircraft mobile gun mount No. 49 has been received at Fort Monroe. This mount is equipped with a slip ring device in the pedestal for the purpose of permitting continuous all-around traverse in either direction without winding up the data transmission cable. Such winding up never causes any difficulty in target practice but might become troublesome in service when targets can be expected to appear from any direction and to fly without regard to any particular field of fire. The critical factors in an electrical device of this kind are the slip rings themselves, the contacts riding on them, and the connections to the electrical wiring of the data transmission system. The Coast Artillery Board has been

directed to test the serviceability of the slip ring device with special reference to any troubles (such as short or open circuits) that may appear under severe conditions of service. Such conditions will include drenching with mud and water.

SECTION III

Miscellaneous

The Board is commencing a study of alternative and emergency methods of fire control for antiaircraft guns, designed to lessen the present degree of dependence upon directors and height finders, the procurement of which during mobilization offers such difficulties. This will parallel a collateral study of the simplest and more expeditious means for computing angular leads for the fire of an antiaircraft machine gun platoon.

Another study, long deferred for lack of time, is now being undertaken. This pertains to the firing data for seacoast guns, and relates especially to avoiding the present complications of correcting on the range board for height of site, in the case of mobile artillery firing from high sites, when the necessary extension of the tide curves causes interference with the curves for other important corrections. This problem, together with the complications which have arisen from firing projectiles of other than standard weight (e.g., 6-in. batteries firing 90-pound HE shell, with range drums graduated for the 108-pound projectile) suggest very strongly the desirability of substituting elevation in angular units for range in yards in the transmission of firing data. There is some reason to believe that this would not only simplify our fire control, but would also eliminate certain errors inherent in present methods.

In collaboration with a representative of the Depart-

ment of Artillery, Coast Artillery School, a revision of TR 435-211, "Antiaircraft Machine Gun Marksmanship," is being undertaken.

The Board has tested an optical instrument fitted with polarizing plates instead of a ray filter for the reduction of glare. While not satisfactory in its present stage of development, this device shows promise of possible usefulness.

Recent studies of artillery firing have suggested the advisability of observing special precautions against flare-backs when firing casemated guns. Methods for reducing the risk of accident from this cause have been recommended.

Publication of instructions relating to the maintenance and test of electrical firing circuits, and methods for reducing the number of misfires experienced in their use, has been recommended.

With a view to inducing battery commanders of antiaircraft gun batteries to fire at targets of greater altitude, certain revisions of the present scoring formula have been proposed. Tables for use in scoring the 16-inch gun practices when firing two-thirds charge have been submitted for approval.

The tests on marking inks for machine gun bullets, recently reopened, are nearing an end. Early standardization of these inks is hoped for.

Certain modifications of the carriage of the 155-mm. gun, to give greater ease to the gun pointer, especially when firing by Case II, have been proposed. These are under study, but as yet the Board has not been convinced of the necessity for these modifications. In this connection, recent correspondence gives reason to hope that tests of the Seacoast Computer T-5, with concomitant on-carriage equipment for the 155-mm. gun, may be undertaken in the not too distant future.

* * * * *

New Army Field Glasses

A NEW line of field glasses especially designed for military use has recently been introduced by the Bausch & Lomb Optical Company of Rochester, New York. The new glass is not merely a modification of the well and not so favorably known EE glass. It is an entirely different and greatly improved instrument.

Bodies of aluminum alloy, light but strong as steel, are covered with a rubber composition that looks like leather, is practically indestructible and provides a good grip. The body is shaped to fit the hand. The inside optical surface is treated chemically and then dyed black. This process gives a surface that will not flake.

The prisms are so mounted that they cannot shift un-

less the entire glass is smashed. No cement is used in the mounting. The optics are ground and polished so that the largest tolerance is two-millionths of an inch. The glasses give a brilliant image, color-free, and flat from edge to edge.

Three models are offered: 6X-30, 7X-35 and 8X-30. A mil scale of approved design is incorporated, but any model may be had without the scale at a lower price. All models have individually-focusing eye-pieces and come in a special military case. The new glass may be purchased through THE COAST ARTILLERY JOURNAL. Prices upon application.

Training Visual Deviation Details

By LIEUTENANT MELBOURNE H. WEST, 251st C.A. (AA)

SATISFACTORY functioning of the bilateral method of observing the deviations of the bursts in antiaircraft artillery firing requires a highly trained spotting detail. Where the amount of time that can be devoted to training is limited, instruction must be intensified to produce the desired result. With proper equipment and methods of instruction, good results may be expected from deviation details composed of National Guardsmen.

The training of the deviation detail in the 251st C.A. (AA) Calif. N.G. prior to the service practice season consists of the presentation of the problem, selection of the men who have the aptitude to act as observers, and practice in reading deviations, using such methods and equipment as can be improvised.

The proper beginning is very important. Before starting preliminary training, indicate on the armory floor the relative positions of the battery, observation stations, and course of the target; or less satisfactorily, show these diagrammatically on a blackboard.

SELECTION OF OBSERVERS

Selection of observers who appear to have the requisite mental alertness and capabilities is facilitated by suitable tests in which the candidate is required to read from the mil scale in a field glass, the vertical and horizontal deviations of a fictitious burst from a stationary miniature target.

For instructional purposes, a circular piece of cardboard about thirty inches in diameter, representing the field of vision of an observing telescope, is placed on a wall. Divide the area into four quadrants. From the center outward each line is graduated to represent five mil intervals; the ten mil graduations are numbered. In each quadrant is mounted about five tufts of cotton to repre-

sent bursts. At the intersection of the lines is placed the forward end of a black strip of paper cut to scale, representing a sleeve target. Using a pointer, the instructor can indicate a burst and require the candidate to give the vertical and lateral deviations in mils with respect to the target.

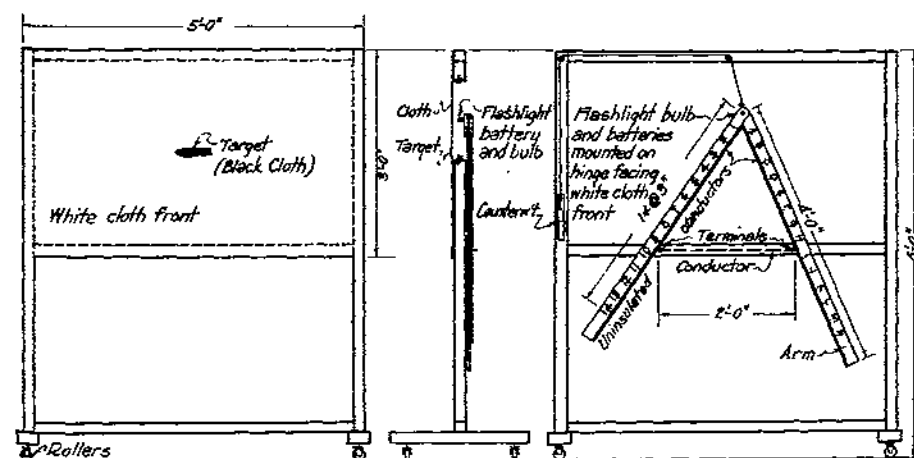
The second phase in the selection of observers is to place on the wall a model of a sleeve target. To the end of a pointer attach suitable material representing a burst; the instructor can place the "bursts" in any desired position. The candidate, equipped with field glasses containing mil scales, is required to read the lateral, vertical or range deviations of the burst. Each deviation called by the observers is checked by the instructor. The rapidity and accuracy of reading enables the instructor to select the best qualified observers.

BURST BOARD

The culminating phase of armory training is practice with a burst board. A number of these boards have been devised, but the one developed and used by the 251st C.A. (AA) is simple in construction and has the advantage of permitting the instructor to check the reported deviation after each course and to point out erroneous sensings.

The burst board consists of a wooden frame 6' x 5' supported on rollers. Upon the upper portion of the frame is mounted a piece of muslin, 3' x 5', in the center of which is fixed a target shaped strip of black cloth. A flashlight bulb, attached to the pivotal point of two intersecting light wooden arms is used to indicate the point burst behind the cloth. To each inside edge of the wooden arms is attached a strip of brass or other suitable metal. The conductors are connected across the hinge with a short piece of flexible wire. The exposed face of

each arm of this assembly is graduated into equal divisions. On one leg the divisions are lettered from A to N, while the other is numbered from 1 to 14. Two terminals, spaced twenty-four inches apart, are attached to the reverse side of the middle horizontal member of the frame; these are connected with a piece of wire. The electrical circuit, for lighting the flashlight bulb, is completed when the uninsulated conductors on the edge of each arm are brought in contact with the fixed terminals. A tow line, operated by a drum and crank, is used to move the burst board across the floor. A line



FRONT ELEVATION

END VIEW

BACK ELEVATION (OPERATOR'S SIDE)

Sketch of (AA) Burst Board

is drawn on the armory floor to indicate the desired course. This line is marked at irregular intervals to show when the bursts will occur.

The operation of the board and tow line requires three men. A "burst" operator causes the light to flash when the board crosses the marks on the floor. This operator calls off the coördinates of each burst to a recorder. The coördinates of each burst are determined by reading the number and letter, marked on the arms, at the instant they are brought into contact with the fixed terminals. The recorder indicates to the operator when to show a flash by calling off "burst" when the leading portion of the target frame crosses each mark on the floor.

The O₁ and O₂ stations are set up at convenient points. Each observer is equipped with a field glass, or a B.C.

telescope if tracking the target is also being practiced. A recorder takes down the reported deviations. For instruction and practice, the burst board is towed along a normal course, but it may be directed along the 45° or 0° courses with only one end station manned. For the purpose of pointing out errors and giving instruction, the course is re-run and checked by the instructor. The target is stopped at each position indicated on the floor and the light flashed using the coördinates recorded for that burst. For example, burst 2 occurred on line 2, and the coördinates were G-3. The exact position of any burst can be reproduced, an accurate check may be made of the observed deviation and the error pointed out to the observer.

Reflections of a Reserve Officer's Wife

BY MRS. GRACE EDGAR

DURING the past few years modern literature has been filled with stories about wives: there have been the "Army Wife and the Navy Wife," "Ex-Wife," "Wife vs. Secretary," and recently I saw a book with the title "Wife in Name Only." But who ever heard of the troubles of a Reserve Officer's Wife?

For two weeks each year we are in the Army and it is at this time that the calm tenor of our placid existence is disrupted. Our family life becomes uproarious and uncertain, being completely dominated by a military obsession. Conversation bristles with such words and phrases as "gun emplacements," "twelve-inch fifty-caliber rifles," "targets," "tactical movements," "right front into line," and "Pass in Review." Dinner becomes mess, coats are blouses, and trousers are slacks.

Such a hustle as we live in when this important time of active duty training approaches. The whole household is upset. The children are ruthlessly ignored and banished to the yard. Uniforms are unpacked, brushed, and inspected to see if they have furnished a nice comfortable home for moths. Dozens of insignia are madly sought in the various chiffonier drawers. Puttees are brought out and polished until they shine. Boots, very tall ones, are tenderly unwrapped and lovingly rubbed. The sword rattles in its scabbard once more. When permitted, the children admiringly watch the unsheathing of this glorious emblem of Mars, exclaiming, "Is daddy going to war?" "Oh, look at the gold on it." "Daddy, do you have to fight?" The Sam Browne belt frequently disappears, to be found later draping the small figure of Junior, who struts before an applauding audience of his playmates. Campaign hats and caps must be tried on before mirrors, to see how they fit. . . . "Why, that one is too small! How in the world did that happen?" Does one's head expand at this important period? How strange!

From the attic the trunk and bags appear, to be made

ready for all the necessary articles and equipment of modern soldiering. The packing is most carefully done by Friend Husband while I meekly stand by and offer mild and humble suggestions which are frequently ignored.

If I have decided to accompany my husband on this military jaunt, I also am very busy, for the children must be taken to mother's for their annual visit, and then, my clothes are just as important as the Major's. Often I debate with myself about going along. It is a very pleasant occasion for me, yet should not a husband have a separate vacation occasionally? Should not he forget the ties and cares of domesticity for a time? . . . but only for a short time! So I alternate, one year I go with him and the next year he goes alone.

The summer that my husband received his major's leaves, we stopped in a southern hotel near the post. At the evening meal, the colored waiter was most attentive to me, solicitously exclaiming, "Yes, Missus" . . . "No Missus" . . . "Just as Missus says." At breakfast the next morning, my husband appeared in uniform and the same waiter served us. But what a difference! The center of attention was not my humble self. "Is everything all right, Major?" "Yes, Major" . . . "No, Major" . . . "Just as you say, Major" . . . There was not much chance for inflation of the ego for mere woman, when brass buttons and rank were present.

Daytimes are sometimes dreary around the hotel unless there are a number of wives of Reservists about. One soon learns that women have no place in the officers' lives until the hour of four. There must be no such thing as petticoat rule in the army. So we spend the day "sitting with our knitting in the good old-fashioned way" until the daily battles are over. Of course, we are allowed to attend parades, and must thrill with approbation even when the shiny sword gets stuck in the ground at "Eyes Right," or the colonel cannot get his sabre in the scabbard with

the proper "swish." We listen in on the parade post-mortems, but we know that our John was perfectly lovely at the head of his battalion; and that mean old colonel really shouldn't have bawled him out, anyway . . . so there!

The years that I do not go to camp with my husband are difficult, at least for a few weeks after the return of the soldier. There is the terrible problem of deflation. For some reason the girls, and this includes all of my sex from twelve to seventy, "just adore a uniform"; whether it is the lure of the brass buttons, or the element of danger ahead, I don't know. John has had his two weeks of worship from the foolish and allegedly fair sex; also he has been in command of something, and has learned to know the blasting tones of his "own monstrous little voice." He has been obeyed. The ego has been greatly inflated. After all of this, he returns to his family and friends who know him for what he really is: kind, considerate, humble, quiet. But he wants to be blustering, swaggering, boisterous, and swashbuckling. Although we try not to be unkind, we realize that he must be brought back to normal. Yearly, we go through this performance, and yearly, the cycle of inflation and deflation goes its round.

Really, you haven't had any troubles at all until you have had the disease of map problems in your home. The mailman delivers a package and John retires to the study; for several nights we have no bridge. Four No Trumps, Little Slam, Five Clubs, and Big Slam give way to Cemetery Ridge, Little Round Top, Seminary Ridge, and Big Round Top. One day Junior, who has ideas of his own about how the war should be won, moved all those funny little red, blue, and green pins hither and thither, and ! ! ! ! ! John exploded into little pieces and the air was filled with red, white, and blue phrases. I gently inquired if that was proper language to use in front of children, but somehow or other I didn't get very far with my child training that evening.

Another one of my troubles is whether I am obliged to listen attentively to all of his army stories, no matter how many times I have heard them in the past. There are a whole series about what the Colonel told the Captain, and the Major told the C.O.; about what the guard said to the Colonel's wife; and about what the R.O.T.C. gun commander said when he dropped the 1,000-pound projectile into the mortar well (or is it pit?). I know the ending of that one, "Sir-r-r, the bullet fell off the bullet buggy," and then we're all supposed to laugh.

What is the psychology of Friend Husband that requires him to be a Reserve officer? It is more than I can figure out. It might be in consequence of some suppression during his formative period; maybe his fond mother didn't allow him to play with tin soldiers, have an air rifle or discharge fire-crackers. It may be that at the office he isn't allowed to boss the rest of the force enough, or at home I may not let him have his own way sufficiently. The inhibitions of suppression are at least overcome during the two weeks each year when he does have someone to dominate. It may be some odd sense of patriotism which sustains him, but that isn't fashionable any longer. Again it may be the psychology of disappointment. During the World War, after all the tremendous preparations to go to the front, he didn't get very far; perhaps he is in a state of mental coma with regard to military affairs, expecting that some day all his study will be rewarded by real action; the psychology of deferred action, of suspended animation.

Personally, I think that he wants to be a leader in some activity, and is secretly quite tickled at being designated as Major or Colonel. He has something that his friends do not have, for in other respects (financially and athletically) they have the best of him. He doesn't imagine himself a second Napoleon, but he does read the biographies of military leaders and imagines himself in their positions. I know he feels that he would have done differently, and could have done better. What the psychologists call that I don't know, substitution or every-man-his-own-hero. But whatever his psychology is, be it egotism or inhibition, it is perfectly harmless, and doesn't break forth violently. It's quite pleasing to know that.

Men have hobbies—fishing, golf, tennis, coin and stamp collecting, hunting, and camping. We women think of this hobby idea as a fine thing and so good to take John's mind off the daily grind. Now, this idea is commendable but why should a man adopt the Army Reserve as a hobby? Perhaps every man secretly desires to be a soldier. After all the hobby of being a Reserve officer is as harmless as any. Really, I don't want to be a golf widow, nor be in continual financial straits from philately nor numismatics.

There's John now, tooting the horn of the family chariot. What's that he's calling, his voice much louder than usual?

"Oh, honey, I'm in luck. My orders've come. I'm going to camp in August." Our yearly madhouse has started.



COAST ARTILLERY ORDERS

(Covering the Period May 1 to June 30, 1936)

Colonel L. C. Brinton, from 1st Corps Area, Boston, to Org. Res. 3d Corps Area, Richmond, June 1.

Colonel W. M. Colvin, from Panama, to 4th Corps Area Hq., Ft. McPherson.

Colonel R. W. Collins, from Org. Res. 4th Corps Area, Knoxville, Tenn., to 11th, Ft. H. G. Wright, June 10.

Colonel E. J. Cullen, from Ft. H. G. Wright, to home and await retirement.

Colonel Albert Gilmor, from military attaché, Poland, to 61st, Ft. Sheridan.

Colonel H. K. Loughry, from instructor, Army War College, to War Department General Staff, May 21.

Colonel G. T. Perkins, to duty with Org. Res., Portland, Oregon. Previous orders amended.

Colonel G. A. Wildrick, from office Chief of Coast Artillery, Washington, to Hawaii, sailing New York, Aug. 14.

Colonel F. E. Williford, from General Staff Corps with troops, 7th Corps Area, to Panama, sailing New York, Oct. 15.

Lieutenant Colonel H. H. Acheson, from instructor C. A. School, Ft. Monroe, to Hawaii, sailing New York, Oct. 30.

Lieutenant Colonel C. W. Baird, from the Philippines, to Org. Res. 2d Corps Area, New York.

Lieutenant Colonel R. D. Brown, from 63d, Ft. MacArthur, to Panama, sailing San Francisco, Aug. 22.

Lieutenant Colonel B. S. DuBois, from Hawaii, to Asst. P.M.S.&T., Univ. of Illinois, Champaign.

Lieutenant Colonel C. A. Chapman, from P.M.S.&T., Univ. of Illinois, to home and await retirement.

Lieutenant Colonel G. W. Easterday, from Panama, to Org. Res. 6th Corps Area, Detroit.

Lieutenant Colonel W. C. Foote, from Panama, to 11th, Ft. H. G. Wright.

Lieutenant Colonel S. F. Hawkins, from Org. Res. 6th Corps Area, to 52d, Ft. Hancock.

Lieutenant Colonel J. H. Hood, from instructor, C.&G.S. School, Ft. Leavenworth, to the Philippines, sailing New York, Sept. 16.

Lieutenant Colonel F. L. Hoskins, from instructor, C.&G.S. School, Ft. Leavenworth, to instructor, Fla. N.G., Jacksonville.

Lieutenant Colonel H. L. King, from Panama, to Hdqrs. 2d Corps Area, awaiting retirement.

Lieutenant Colonel C. B. Meyer, from 61st, Ft. Sheridan, to Panama, sailing New York, Oct. 15.

Lieutenant Colonel H. F. Nichols, from 13th, Ft. Barrancas, to 4th C.A. Dist., July 1. Previous orders amended.

Lieutenant Colonel E. P. Noves, from Hawaii, to instructor, Ga. Natl. Guard, Statesboro.

Lieutenant Colonel P. H. Ottosen, from Hawaii, to Univ. of Washington, Seattle.

Lieutenant Colonel R. N. Perley (I.G. D.), from Panama to Hdqrs. 5th Corps Area, Ft. Hayes. Previous orders revoked.

Lieutenant Colonel O. L. Spiller, from office Chief of Coast Artillery, Washington,

D. C., to Panama, sailing New York, Oct. 15.

Lieutenant Colonel E. A. Stockton, Jr., Bureau of Insular Affairs, to Panama, sailing New York, Dec. 16.

Lieutenant Colonel A. G. Strong, from 2d. C.A. Dist. Org. Res., to First Army Staff, Boston, Aug. 15.

Lieutenant Colonel Meade Wildrick, from Panama, to Second Corps Area, Governors Island, awaiting retirement.

Lieutenant Colonel E. N. Woodbury, from Asst. P.M.S.&T., Univ. of Washington, to home awaiting retirement.

Major R. W. Argo, from instructor, C.A. School, Ft. Monroe, to Asst. P.M.S.&T., Univ. of Delaware, Sept. 1. Previous orders amended.

Major T. R. Bartlett, from Panama, to instructor, So. Car. Natl. Guard, Columbia.

Major D. M. Cole, retired, for the convenience of the Government.

Major E. H. Freeland, to Panama, sailing New York, Sept. 1. Previous orders amended.

Major R. T. George, from Panama, to instructor, R.I.N.G., Providence.

Major H. F. Grimm, Jr., from instructor, C.A. School, Ft. Monroe, to Panama, sailing New York, Sept. 1.

Major P. W. Hardie, from 3d, Ft. Rosecrans, to 11th, Ft. H. G. Wright, June 25.

Major A. M. Jackson, from artillery representative Engineer Board, Ft. Belvoir, to Panama, sailing New York, Aug. 14.

Major C. B. Lindner (Finance Dept.), from property auditor, to Finance officer, Hdqrs. 1st Corps Area.

Major W. R. Maris, from the Philippines, to Asst. P.M.S.&T., Univ. of Maine, Orono.

Major L. C. Mitchell, from Asst. P.M.S.&T., Univ. of Cincinnati, to military attaché, Rio de Janeiro, June 1.

Major J. B. Muir, Jr., from 14th, Ft. Worden, to Asst. P.M.S.&T., Univ. of Illinois, Champaign.

Major William Sackville, from military attaché, Rio de Janeiro, to artillery representative Engineer Board, Ft. Belvoir.

Major H. E. Small, promoted Lieutenant Colonel, June 1.

Major R. C. Snidow, retired physical disability, June 30.

Major E. H. Taliaferro, Jr., from instructor, C.&G.S. School, Ft. Leavenworth, to 5th, Ft. Hamilton, Aug. 1.

Major G. W. Whybark (QMC), from detail in Quartermaster Corps, Ft. Williams, Maine, to Panama, sailing New York, Nov. 12.

Captain H. C. Barnes, Jr., from student, C.&G.S. School, Ft. Leavenworth, to American Battle Monuments Commission, Washington, D. C. Previous orders revoked.

Captain C. O. Bell, from the Philippines, to 14th, Ft. Worden.

Captain A. P. Bruner, from instructor, So. Car. Natl. Guard, to 51st, Ft. Monroe, Aug. 15.

Captain J. R. Burnett, from Panama, to 13th, Ft. Barrancas.

Captain W. H. Carlisle, from the Philippines, to 52d, Ft. Hancock.

Captain R. T. Chaplin, from Asst. P.M.S.&T., V.P.I., Blacksburg, to Panama, sailing New York, Sept. 1.

Captain C. H. Crim, from Asst. P.M.S.&T., Mich. State College, East Lansing, to 52d, Ft. Hancock, and from Ft. Hancock to the Philippines, sailing New York, Jan. 8, 1937.

Captain R. E. Dingeman, from Asst. P.M.S.&T., The Citadel, Charleston, to 51st, Ft. Monroe.

Captain R. A. Ericson, from Asst. P.M.S.&T., Univ. of Minnesota, to Panama, sailing New York, Aug. 1.

Captain L. D. Flory, from student, C.&G.S. School, Ft. Leavenworth, to Sixth Corps Area, Chicago.

Captain R. H. Grinder, from 62d, Ft. Totten, to Panama, sailing New York, Oct. 15.

Captain L. Y. Hartman, from Panama, to 14th, Ft. Worden.

Captain F. L. Hayden, from U. S. Military Academy, West Point, to Hawaii, sailing New York, Aug. 14.

Captain E. A. Kleinman, from Asst. P.M.S.&T., Univ. of Pittsburgh, to the Philippines, sailing New York, Sept. 16.

Captain D. B. Latimer, from instructor, U.S.M.A., West Point, to submarine mine depot, Ft. Monroe.

Captain J. R. Lowder, from 14th, Ft. Worden, to Hawaii, sailing San Francisco, Sept. 5.

Captain J. E. McGraw (Signal Corps), from 51st Signal Battalion, Ft. Monmouth, to the Philippines, sailing New York, Sept. 16.

Captain E. G. Martin, from student, C.A. School, Ft. Monroe, to the Philippines, sailing New York, Sept. 16.

Captain E. A. Merkle, from Asst. P.M.S.&T., Fordham Univ., to the Philippines, sailing New York, Sept. 16.

Captain A. D. Miller, from Hawaii, to 2d, Ft. Monroe.

Captain R. L. Miller, from student, C.A. School, Ft. Monroe, to Panama, sailing New York, Sept. 1.

Captain J. D. Mitchell, from 69th, Ft. Crockett, to Asst. P.M.S.&T., Univ. of Pittsburgh.

Captain J. E. Mortimer, from 61st, Ft. Sheridan, to Panama, sailing New York, Sept. 1.

Captain H. H. Myrah, from 14th, Ft. Worden, to Panama, sailing San Francisco, July 18.

Captain W. F. Niethamer, from 51st, Fort Monroe, to Panama, sailing New York, Sept. 1.

Captain W. H. Papenfoth, from Oakland public high schools, to 69th, Ft. Crockett, July 15.

Captain J. E. Reiersen, from Asst. P.M.S.&T., A. & M. College of Texas, to Panama, sailing New York, Oct. 15.

Captain J. W. Smith (PS), from Ninth Corps Area, San Francisco, to the Philippines, sailing San Francisco, Feb. 2, 1937.

Captain Horace Speed, Jr., from Owensboro High School, Owensboro, Kentucky,

to Quartermaster Corps, Ft. Jay, N. Y., Sept. 1.

Captain Raymond Stone, Jr., from the Philippines, to 69th, Ft. Crockett.

Captain E. C. Wallace, from 63d, Ft. MacArthur, to Asst. P.M.S.&T., Univ. of California, Los Angeles.

First Lieutenant E. T. Ashworth, from Hawaii, to 14th, Ft. Worden.

First Lieutenant W. H. Ball, from the Philippines, to 6th, Ft. Winfield Scott.

First Lieutenant A. S. Baron promoted Captain, June 30.

First Lieutenant A. H. Bender promoted Captain, June 30.

First Lieutenant Edward Bodeau, from the Philippines, to 62d, Ft. Totten.

First Lieutenant W. H. Brucker, from Hawaii, to 13th, Ft. Barrancas.

First Lieutenant H. A. Brusher promoted Captain, June 12.

First Lieutenant C. C. Carter promoted Captain, June 12.

First Lieutenant E. N. Chace, from Hawaii, to 11th, Ft. H. G. Wright.

First Lieutenant E. A. Chapman, from Panama, to 6th, Ft. Winfield Scott.

First Lieutenant C. M. Conzelman promoted Captain, June 12.

First Lieutenant D. R. Corum, from 15th, to detail, Ordnance Department, and to Commanding General Hawaiian Department.

First Lieutenant W. V. Davis promoted Captain, June 30.

First Lieutenant W. H. Francis, from student, C.A. School, Ft. Monroe, to Panama, sailing New York, Sept. 1.

First Lieutenant A. G. Franklin, Jr., promoted Captain, June 30.

First Lieutenant W. G. Fritz, from Panama, to 62d, Ft. Totten.

First Lieutenant N. T. Haakensen promoted Captain, June 30.

First Lieutenant M. H. Harwell promoted Captain, June 12.

First Lieutenant W. B. Hawthorne promoted Captain, June 12.

First Lieutenant E. B. Hempstead, from 6th, Ft. Winfield Scott, to U.S.M.A., West Point.

First Lieutenant P. A. Jaccard promoted Captain, June 30.

First Lieutenant R. J. Lawlor, from Panama, to 14th, Ft. Worden.

First Lieutenant O. J. Levin promoted Captain and retired physical disability, June 30.

First Lieutenant C. W. McGeehan promoted Captain, June 12.

First Lieutenant M. J. McKinney promoted Captain, June 12.

First Lieutenant F. J. McMorrow, from the Philippines, to 62d, Ft. Totten.

First Lieutenant W. L. McNamee, from student, C.A. School, Ft. Monroe, to student, Mass. Institute of Tech., Cambridge, June 5.

First Lieutenant J. E. Metzler, from Panama, to 52d, Ft. Monroe.

First Lieutenant F. F. Miter promoted Captain, June 12.

First Lieutenant R. J. Moulton promoted Captain, June 30.

First Lieutenant P. B. Nelson promoted Captain, June 30.

First Lieutenant W. H. Parr, from student, C.A. School, Ft. Monroe, to Panama, sailing New York, Sept. 1.

First Lieutenant C. L. Partin, from 2d, Ft. Monroe, to Hawaii, sailing New York, Oct. 30.

First Lieutenant W. A. Perry, from 63d, Ft. MacArthur, to student, C.A. School, Ft. Monroe, Aug. 25.

First Lieutenant M. G. Pohl, from 2d, Ft. Monroe, to the Philippines, sailing New York, Sept. 16.

First Lieutenant C. W. Powell, from 61st, Ft. Sheridan, to Panama, sailing New York, Sept. 1.

First Lieutenant G. F. Powell, from 6th, Ft. Winfield Scott, to Ordnance Department, Watertown Arsenal, Watertown.

Previous orders revoked.

First Lieutenant J. G. Reynolds, from the Philippines, to 61st, Ft. Sheridan.

First Lieutenant Andrew Samuels, Jr., from student, C.A. School, Ft. Monroe, to Panama, sailing New York, Sept. 1.

First Lieutenant F. F. Schieffler promoted Captain, June 12.

First Lieutenant H. W. Schenck, from Hawaii, to 63d, Ft. MacArthur.

First Lieutenant A. W. Schermacher, from Hawaii, to 62d, Ft. Totten.

First Lieutenant J. R. Seward, from student, C.A. School, Ft. Monroe, to Panama, sailing New York, Sept. 1.

First Lieutenant M. L. Skinner promoted Captain, June 12.

First Lieutenant E. C. Smallwood promoted Captain, June 12.

First Lieutenant J. F. Thorlin, from the Philippines, to 69th, Ft. Crockett.

First Lieutenant H. N. Toftoy promoted Captain, June 12.

First Lieutenant E. R. C. Ward promoted Captain, June 30.

First Lieutenant T. B. White promoted Captain, June 30.

First Lieutenant L. A. Zimmer promoted Captain, June 30.

Second Lieutenant Alfred Ashman, from 6th, Ft. Winfield Scott, to Commanding General Air Corps Center, Randolph Field, Texas, July 1.

Second Lieutenant A. J. Cooper, Jr., promoted First Lieutenant, June 13.

Second Lieutenant D. R. Corum promoted First Lieutenant, June 13.

Second Lieutenant I. W. Cory promoted First Lieutenant, June 13.

Second Lieutenant G. H. Crawford promoted First Lieutenant, June 13.

Second Lieutenant H. C. Donnelly promoted First Lieutenant, June 13.

Second Lieutenant C. G. Dunn promoted First Lieutenant, June 13.

Second Lieutenant F. H. Fairchild promoted First Lieutenant, June 13.

Second Lieutenant T. deN. Flynn promoted First Lieutenant, June 13.

Second Lieutenant R. E. Gallagher promoted First Lieutenant, June 13.

Second Lieutenant S. F. Giffin promoted First Lieutenant, June 13.

Second Lieutenant P. N. Gillon (Ord. Dept.) promoted First Lieutenant, June 13.

Second Lieutenant T. A. Glass promoted First Lieutenant, June 13.

Second Lieutenant H. R. Greenlee, Jr.,

from 2d, Ft. Monroe, to Panama, sailing New York, Sept. 1.

Second Lieutenant P. W. Guiney, Jr., promoted First Lieutenant, June 13.

Second Lieutenant E. E. Hackman, promoted First Lieutenant, June 13.

Second Lieutenant R. W. Hain promoted First Lieutenant, June 13.

Second Lieutenant C. W. Hill, from 2d, Ft. Monroe, to the Philippines, sailing New York, Sept. 16.

Second Lieutenant F. M. Humphries promoted First Lieutenant, June 13.

Second Lieutenant Harry Julian promoted First Lieutenant, June 13.

Second Lieutenant E. H. Kibler, Jr., promoted First Lieutenant, June 13.

Second Lieutenant V. H. King promoted First Lieutenant, June 13.

Second Lieutenant J. J. Lane promoted First Lieutenant, June 13.

Second Lieutenant W. J. Ledward promoted First Lieutenant, June 13.

Second Lieutenant R. C. Leslie promoted First Lieutenant, June 13.

Second Lieutenant L. J. Lipscomb, Jr., promoted First Lieutenant, June 13.

Second Lieutenant W. B. Logan promoted First Lieutenant, June 13.

Second Lieutenant A. A. McCrary promoted First Lieutenant, June 13.

Second Lieutenant T. K. MacNair promoted First Lieutenant, June 13.

Second Lieutenant S. M. McReynolds, Jr., promoted First Lieutenant, June 13.

Second Lieutenant R. L. Matteson promoted First Lieutenant, June 13.

Second Lieutenant Robert Morris, from 52d, Ft. Hancock, to Hawaii, sailing New York, October 30.

Second Lieutenant C. G. Patterson promoted First Lieutenant, June 13.

Second Lieutenant R. A. Pillivant, from 61st, Ft. Sheridan, to Hawaii, sailing New York, August 14.

Second Lieutenant L. C. Ratcliffe promoted First Lieutenant, June 13.

Second Lieutenant F. B. Reybold, from 52d, Ft. Monroe, to the Philippines, sailing New York, Sept. 16.

Second Lieutenant F. H. Shepardson promoted First Lieutenant, June 13.

Second Lieutenant E. O. Taylor promoted First Lieutenant, June 13.

Second Lieutenant H. S. Tubbs promoted First Lieutenant, June 13.

Second Lieutenant R. A. Turner promoted First Lieutenant, June 13.

Second Lieutenant F. J. Zeller promoted First Lieutenant, June 13.

Master Sergeant E. D. Farris, 14th, Ft. Worden, retired, June 30.

Master Sergeant R. G. Hamilton, 15th, Ft. Kamehameha, retired, May 31.

Master Sergeant G. W. Mooney, 11th, Ft. H. G. Wright, retired, May 31.

Master Sergeant C. R. Turrell, 52d, Ft. Hancock, retired, May 31.

First Sergeant John McVey, 8th, Ft. Preble, retired, May 31.

First Sergeant Walter Steiert, 11th, Ft. H. G. Wright, retired, May 31.

Sergeant Willis Babcock, 11th, Ft. H. G. Wright, retired, May 31.

Sergeant A. E. Sauvain, 59th, Ft. Drum, retired, June 30.

BOOK REVIEWS

THE AMERICAN ARMY IN FRANCE 1917-1918.

By Major General James G. Harbord, U. S. A. Little, Brown and Co., 1936. \$5.00.

Reviewed by Major General H. D. Todd, Jr.

General Harbord needs no introduction to either the military or the business world of America. First occupying every grade in the Army to include that of Major General and now the head of a great corporation, his recital of events can be relied upon as interesting and his judgment of men as accurate.

To some men came the experience of duty with combat divisions, to others the staff work connected with the active operations of large units, while again to others the work of assisting in the tremendous effort necessary to transport and supply our large Army in France.

General Harbord was engaged in all of these duties and with the rank that required him to organize and direct, consequently it is logical for him to quote from Virgil, as he does in the preface: "These things I saw, and a part of them I was."

It then naturally follows that he is in a position to produce a complete and authoritative record of the A.E.F., and the work of this educated and intelligent soldier will be considered a finished product. Many questions have been answered. What were the events that led the United States to declare war? Why was Pershing selected to command? Who formed his staff when he sailed for France? What was the experience of these officers from the date of sailing on the Baltic to the final establishment of the G. H. Q. at Chaumont—what studies undertaken, what decision made? Theirs was a stupendous task even before the Army was formed and one that history will record as most successfully accomplished.

Owing to the seemingly endless discussion now in progress in regard to why this country went to war and, also, because of the general ignorance being displayed, the first chapter of the book entitled "As War Approached" should be widely read.

The facts described by the author clearly indicate the principal causes to be: the German unrestricted submarine warfare, their brutal interpretation of the laws of war, the sabotage conducted by German agents in this country, the attempt of the German Government to cause Mexico to attack the United States, and in general the acts that induced our Secretary of the Interior to write: "We can stand Germany's insolence no longer." And finally from his study of this subject, the author is of the opinion that "no better analysis of the causes that took the United States into the World War can be made than

that which he (the President) delivered to Congress on the afternoon of April 2, 1917."

General Harbord has the happy faculty of giving what may be termed the human side of history. He is evidently a great student of men and in his estimation of those with whom he came in contact, he dwells on their good qualities rather than any others he may have discovered. This imparts a pleasant atmosphere to the book.

It was really a wonderful reception those American officers of Pershing's staff had first in England and then in France. They were entertained by the highest in both political and military life and also assisted in every way. Consequently, the author's account of this period describes in a most interesting manner events, conversations and opinions not generally known by historians. Many war historians accurately describe the strategical and tactical operations of combat units but they seldom write of the stupendous work that must be accomplished behind the lines; and here again the author is particularly well fitted for the latter task.

Our Field Service Regulations contemplated conditions very different from those pertaining to receiving, housing, supplying and maintaining nearly two million men in a foreign land and across an ocean. The chapters on the "Organization for Supply of the A.E.F." and "Getting ready for the Divisions to Come" should be considered military text books and studied accordingly.

Many Americans are aware of the difficulties experienced by General Pershing in the formation of an American Army but few know of what was in reality a severe unending struggle on his part to prevent our smaller units being scattered among those of our allies and under the higher French and English command. There was also a difference of opinion between Pershing and the Allies in reference to methods of training. Pershing insisted in emphasizing the importance of training for open warfare while the Allies, particularly the French, placed the greater reliance on training for trench warfare.

In general, officers of the American Army act and talk in an honest, frank manner and hence one can easily understand the severe task confronting General Pershing when he came in contact with foreigners who had generations behind them steeped in international intrigue and deceit. The whole story of "this long and often acrimonious reiteration of requests and denials" in which "not only soldiers but statesmen took part, except that on the American side the burden was principally borne on the well squared soldiers of John J. Pershing," is clearly told and can undoubtedly be accepted as history.

Underlying the whole affair there appeared to be the feeling that our officers could not measure up to those of

BOOK REVIEWS

A HISTORY OF THE GREAT WAR, 1914-1918. By C. R. M. F. Cruttwell, Principal of Hertford College, Oxford, formerly fellow of All Souls College, Oxford. Clarendon Press, 1934. 630 pages. Price \$5.50.

By Major General H. D. Todd, Jr., Retired

Mr. Cruttwell has covered practically all the military and naval operations of the World War. While he did not attempt to consider the causes of the war or to discuss the settlement which followed, he aimed to present "the general reader with an accurate, intelligent, and interesting account of the greatest conflict between civilized states."

In a preliminary discussion he brings out the power that the people in each country exercised on the State. In their desire for both security and happiness they were willing to go to extreme lengths and the author states that "it is an amazing paradox that, in the very age when the working class were everywhere gaining power and increasing in comfort, when commercial competition was becoming keener and keener, they should have been ready, nay, often anxious, to impose upon themselves this tremendous servitude and potential risk."

Then follows a consideration of the plans of both the German and French leaders, and he refers to the "wild and premature offensive" resulting from the French Plan 17. The events leading up to and including the battle of the Marne are clearly described and then the author passes to the operations around Tannenburg and Lemburg, and to the 1914 campaign in Poland, before returning to the Western Front. By this method the reader is able to carry a continuous picture of the great conflict, particularly as the operations at sea are included in their chronological order. The reasoning and conclusions on the Dardanelles-Gallipoli campaign will be concurred in by most educated soldiers. The author's account of gas attacks and his views on the ethics of gas warfare are very interesting.

In reference to the battle of Loos, he is sharply critical of the British leader, Sir John French. In reference to this officer's successor, Marshal Haig, Mr. Cruttwell states: "The new Commander-in-Chief was also unfortunately a Cavalryman." "Religious to the depth of his Lowland soul, he gradually acquired an almost Cromwellian conviction that God had marked him out as an instrument for the triumph of the Allies. If adversity, as Bacon says, is the blessing of the New Testament, Haig grew with disappointment and disaster, until he stood out in the last four months of the war as a very great general."

With the assistance of clear maps, the account of the Russian retreat in 1915 is more easily followed than is the case with most other histories. "This great campaign

had been a triumph not of the big battalions—for the Central Powers were outnumbered by about 450,000 men, but of superior organization."

While a knowledge of history should convince every one that it would be most improbable if not impossible for the United States to remain absolutely neutral in case of war between nations possessing sea power, many apparently well-educated Americans are insisting that this country could and should maintain such neutrality.

These people should carefully read the chapter on the "British Blockade and the First German Submarine Campaign." To write a history of the military and naval operations throughout the four years of the World War is a stupendous task. Moreover the work grows greater as each year passes and more and more data becomes available. Mr. Cruttwell's investigations evidently covered an enormous field. His work shows great industry, a highly educated and logical mind and, in general, his statements are supported by excellent authorities—authorities referred to by footnotes. In one respect, however, he leaves the realm of facts for that of fancy or hearsay. This is when he refers to some of the operations of the American troops; a procedure, by the way, that is typical of many if not all Englishmen who write on incidents involving our troops. To begin with, our St. Mihiel offensive is referred to as the French-directed battle of St. Mihiel. Then as another example, Mr. Cruttwell in reference to our Meuse-Argonne offensive and the transfer of our troops from the St. Mihiel Sector writes: "The traffic congestion became fearful. It is said that 700 men were starved to death in the front-line trenches: many units after receiving no rations for four days, returned to the rear to fetch them. Up and down traffic had been unwisely allowed on the same roads, and on one occasion an absolute block occurred for twelve hours British and French officers were hurriedly sent to reorganize the whole system."

General Hugh A. Drum, former Chief of Staff of the 1st American Army recently told the reviewer that General John DeWitt and his assistants under the general supervision of General Drum and his staff planned the entire movement from the St. Mihiel sector to the Meuse-Argonne area and that when the French officers above referred to appeared at First Army Headquarters they were politely told that their presence was neither required or desired; whereupon with equal politeness they departed.

The British brain trusters did not appear. Also, the reviewer having taken two brigades of field artillery from one sector to the other saw no Frenchmen and received no orders from Frenchmen until he left the American Sector and entered the area of the Second French Army just before the last night's march. The entire movement went

June 1st on both sides of the Paris-Metz highway, the French had been retiring along the whole Rheims-Soissons front from one to ten miles a day for ten days. No unit along the whole front had stood against the German masses. The first unit to stand was the Second Division and it not only stood but went forward." One of its Brigades, the Marine Brigade, "used up four German Divisions." The Third Division stopped and drove back three German divisions and its commander reported that by noon of July 16th "there were no Germans in the foreground of the Third Division except the dead." It is probable however that the most convincing testimony of the great value of the American effort comes from the statements of the German high command.

General Harbord's quotation from the Memoirs of Prince Max of Baden plainly indicate that many of the German statesmen and generals considered America to be the decisive power.

General Harbord's duty with front line troops ended with the Soissons offensive and from then on he was in command of the S.O.S. It is evident that the problem of supplying an army of two million men within or near the frontiers of the United States would be very simple compared with that confronting the S.O.S. in France. But one must read, and read carefully, the book of General Harbord's in order to fully comprehend the enormous amount of work that was successfully accomplished behind the lines. In fact so successful was this work in conjunction with that of the War Department that "The United States had the best fed, the best clothed, the best shod, and the most carefully looked after soldiers in the Great War."

Throughout the six hundred pages of the book there runs a thread that is never broken—the great admiration of Harbord for Pershing during their close association of many years. Indeed the best pen-picture existing today of the Commander-in-Chief of the A.E.F. is contained in "The American Army in France."

THE FUTURE OF INFANTRY. By Liddell-Hart. Military Service Publishing Company, 1936. 91 pages. \$1.00.

This summary of Captain Liddell-Hart's thought on modern infantry plainly reveals that he is not, as so many believe, a fanatic supporter of mechanization. Little in his book cannot be subscribed to heartily by American infantrymen—except those who still think machine guns can be captured with bayonets.

Captain Liddell-Hart sees three principal forms of infantry attack: (1) *The stalking attack*—the old Indian tactics of silent approach used to get within sure striking distance of defending machine guns. (2) *The masked attack*—attack covered by night, fog, or artificial fog. (By far the greater part of successful World War attacks were cloaked in fog.) (3) *The baited attack*—a simulated retirement followed by an energetic counteroffensive attack.

JOSEPH I. GREENE.

THE BATTLE OF JUTLAND. By Commander Holloway H. Frost, U. S. Navy. U. S. Naval Institute, Annapolis, Md. 571 pages. Illustrated. \$4.50.

Reviewed by Captain W. D. Puleston, U. S. N.

Probably the earliest account of the Battle of Jutland, written by an American naval officer, was one by Rear Admiral Knight, President of the Naval War College, shortly after its occurrence; based on the first brief official reports. Since that time the battle has been studied continuously at the Naval War College, and several American naval officers have written articles upon this most recent and most important naval battle.

Frost was at the Naval War College when the first news of the battle of Jutland reached this country. From that moment until his death he studied every piece of information he could obtain on the subject. He visited Germany, and I believe England, in search of data. He probably spent more time in painstaking research to establish the facts of Jutland than any other writer. The subject of that battle was scarcely out of his mind from the time it happened until his untimely death. It is not too much to say that he knew in more detail what happened in Jutland than any officer of his generation, even including those who actually were present at the battle.

It is difficult to write of Commander Frost's book on Jutland without recalling his vivid personality and his extreme devotion to the naval profession—and to the profession of arms, for his love of the military profession embraced fighting on shore as well as at sea. Nor was his admiration for a great fighting man limited to one nationality. His face would light up as he recalled some achievement of Wolfe or Frederick the Great, just as it would over the wonderful achievements of Nelson, Farragut, or John Paul Jones. Napoleon's dictum about audacity was ever on his tongue.

Frost did not confine his devotion to daring to lip service. As a young officer he qualified first in submarines and then in aviation. He thought courage was not only a natural virtue but one that should be cultivated. He was convinced courage grew with use, and he strove to keep himself courageous—because he was forever seeking to qualify for High Command and believed that only by the continuous exercise of courage could he be sure of overcoming the tendency to timidity that his reading of history taught him almost always engulfs maturity and old age.

It is, one of the ironies of life that having spent his whole adult manhood in preparation for High Command in war Frost should die in a hospital bed from a comparatively minor infection.

With this background of the author, we know in advance what to expect of his book. By every instinct of his nature he was bound to condemn the prudence of Jellicoe, otherwise he would have denied his whole previous life.

The book first gives a summary of the condition of the combatants on the eve of Jutland; then Jutland, the bulk of his book; and finally carries us to the end of the War

and gives the effect of Jutland on the War. Throughout it all, the reader is furnished information from both sides. This information was obtained over a period of years and included consultation with some of the prominent officers of the High Seas Fleet and a study of official German documents.

Frost's book is at once exhaustive, and in the tactical details to the average reader may even be exhausting. And it is necessary to warn the reader against being too sure of the exact details of the drawings in Frost's book. These drawings are probably the most accurate of any in existence. Nevertheless, considerable experience in endeavoring to obtain exact data of the positions of ships engaged in peace time maneuvers shows it is quite impossible to place the ships as accurately as has been done in this book. For this reason, the reader should beware of accepting the positions given as positively correct, and keep this limitation in mind when drawing tactical conclusions from the detailed sketches.

To most military and naval readers, the tactical aspects of Jutland are the most important part of the book, for few officers will ever be called upon to make strategical decisions, while many junior officers may be called upon for tactical decisions. Therefore, they can do no better than to familiarize themselves with the various tactical situations that arose. Unfortunately it is impossible to show in sketches the kaleidoscopic features of battle and a student should endeavor to imagine the rate at which ships are moving and the brief interval of time permitted for decisions.

It is also quite impossible to diagram the human element or to reproduce the heat of battle in a sketch, so anyone who wishes to derive the full benefit of Frost's painstaking work should read with it a book, "The Fighting at Jutland," written by British officers who took part in the battle, and edited by Fawcett and Hooper.

I do not think Commander Frost was generous, or even just, in his criticism of Admiral Scheer and Admiral Beatty. The primary reason for his failure is that he expected too much of them. Nor can I subscribe to his extraordinary praise of Admiral Hipper, but am rather inclined to think that the British Scouting Force, under Beatty's general direction, served Jellicoe better than Hipper served Scheer. Whatever fault may be charged to Beatty, he did deliver the German force into the hands of Jellicoe and as nightfall came Beatty submitted, by signal, a plan to Jellicoe that would have insured a decisive action on the succeeding day. On the contrary, whatever merit Hipper had, he led his chief, Admiral Scheer, into a naval net from which escape should have been impossible.

That Beatty was more of a fighter than an organizer is plain from his career, that he failed to indoctrinate the Commander of the Fifth Battle Squadron seems to be obvious and it had tremendous results through the day of action—but Beatty was not to blame that Admiral Fisher's ideas on ship design resulted in tin clad cruisers

taking their place in the line of battle. Beatty was not responsible for the defective fuses in the British shells. Beatty took the ships turned over to him by the Admiralty and fought them, we think on the whole very well. At least he fought determinedly throughout the day and was prepared to continue the fight throughout the night. Had he been Commander-in-Chief, Jutland would have been a decisive battle.

Nor can I entirely agree with the praise that Frost gives the German ships for stopping to pick up survivors during a battle. Commander Bingham, with more wisdom and courage, refused to accept any assistance lest he prevent other ships from taking part in the battle.

In discussing the effects of Jutland, Frost makes the statement that Beatty early in 1918 almost reduced the doctrine of the fleet to the defensive of 1914. This is amazing, and I believe will be difficult to sustain. Many of our officers were in the Grand Fleet at the time and can give positive testimony on this point. The inference, by Frost, that the mine barrage was laid in the Northern part of the North Sea, on account of the High Seas Fleet, is not plausible. Many factors fixed its position, but it was necessary it be laid where it could be watched so it could not be swept.

Nor did memories of Jutland detain the huge armies in England, in 1917-1918. Lloyd George kept them at home, because he did not want to turn them over to General Haig, and only Gough's defeat in March, 1918, forced him to send them to France.

But after all I have said in disagreement with Frost's carefully prepared work on Jutland, I wish to add that I still think it is one of the best books on that battle published, or likely to be published. Not the least merit of the book is that throughout its pages shines the fine military spirit of its author, with his high ideals of the profession of arms.

THIS FLYING GAME. By Brigadier General H. H. Arnold and Major Ira Eaker. \$3.00.

Reviewed by Major Gordon B. Welch, O.D.

"The sky's the limit" say the authors of *This Flying Game* at the end of 268 pages designed to give the youth of America some of the basic information necessary for an elementary understanding of the history, technique, and present status of aviation.

The early studies of Leonardo de Vinci are mentioned and the first balloonists are given full credit for their courage and ingenuity. But to Brigadier General H. H. Arnold and Major Ira Eaker, both of the United States Army Air Corps, and co-authors of *This Flying Game*, modern aviation really began with the work of the Wright brothers, who stand at the head of their list of "Heroes of the Air."

Santos-Dumont, Farman, Bleriot, Glenn Curtis, and others follow on the list until the World War made

heroes of too many for such a toll, and a new designation came into being. Out of this war came the Aces and the Ace of Aces. Colonel Bishop, fighting with the British, is awarded the title of international Ace of Aces. Behind him stand Ball, Guynemer, Fonck, Rickenbacker, Lufberry, and many others.

Following the sagas of these early flyers are chapters on the mechanics of flight and the technique of flying. The high standards and arduous training of military and naval pilots are described, with an outline of their duties. The specifications for, and duties of, transport pilots and mechanics are covered at some length.

The chapter on Air Power, though limited in scope and in completeness of analysis, is well worth reading. The following excerpts indicate some of the principal theses that are developed:

An entirely new conception of the use which will be made of air power has been brought out by aerial strategists in Europe. They believe that aerial attackers will swarm across boundaries in successive waves. . . . Some of the foremost waves may be annihilated, but the bombers will not be stopped. The formations will continue persistently onward as relentless as the waves of the sea.

Authorities seem to agree that the best way to stop hostile aerial operations is to destroy the planes at their bases.

Antiaircraft guns can and will be used for the protection of the most important military targets.

One could wish for a good deal more of this sort of discussion. When the bombardment aviation swarms across the border, will its objective be the enemy cities and their defenseless inhabitants as well as the more military targets described? If the enemy's cities, what about reprisals? How necessary are the civilian bomb-proofs that are becoming popular in certain countries, and the civilian gas masks for sale here and there in troubled parts of the world? When two powers of about equal air strength meet in the air will the two air forces destroy each other and throw the struggle back onto the ground and into the trenches? These and many other questions are in need of thoughtful evaluation.

He would be a rash man indeed who would prophesy the future of flying. Its immediate past has seen too many prophecies prove false while still in the mouths of the prophets. The authors of the present volume do not let themselves be caught in this trap. However, they do venture a few suggestions based upon the probable solution of the application of certain engineering knowledge already available. Most of these suggestions pertain to the size, speed, and safety of the airplane itself and to technical means for its operation, notably for blind flying and blind landing. Many of these prophecies will doubtless come true in the near future, and along with them will perhaps come changes that even these enthusiastic authors did not dare predict.

On this note the story ends. It has been primarily a story for children. The serious student must look elsewhere for any but the most elementary information.

NAPOLEON AND WATERLOO, THE EMPEROR'S CAMPAIGN WITH THE ARMÉE DU NORD 1815. By Major A. F. Becke, R.F.A. (Retired). 320 pages. \$2.00.

Reviewed by Lieutenant Colonel R. B. Colton, S. C.

This book tells the military story of the 100 days (approximately) from the time of Napoleon's landing on March 1, 1815, near Cannes en route from Elba to St. Helena via Waterloo.

This volume is a very readable, little-documented revision of an earlier detailed and fully documented book covering the same campaign. The fact that Major Becke is obviously an impartial admirer of Napoleon, Wellington and Blücher does not detract from the value of the book. One feels, however, that the facts presented fail to justify much of the criticism of Ney and Grouchy; indeed, the fact that both Ney and Grouchy stuck to the letter of their orders and failed, the one during the battle of Ligny and the other during the battle of Waterloo, to send troops to Napoleon's assistance would seem to indicate that Napoleon had indoctrinated his marshals with the idea of obedience rather than initiative.

The book constitutes excellent collateral reading for a student of military organization, strategy and tactics.

HISTORY OF AMERICAN SAILING SHIPS. By Howard I. Chapelle. 386 pages. Illustrated. \$7.50.

Reviewed by Colonel Paul D. Bunker.

Authoritative, exhaustive and yet provocative of further research, this book will probably become a classic; without it no nautical library can be called complete. The author, a naval architect by profession, here sets forth the results of much study and research and gives us a book that is fascinating to mariner, yachtsman, and layman alike—though the latter is due for some rather severe jolts in his complacency as regards American sailing craft.

Mr. Chapelle divides his stout volume into seven chapters which relate in turn to: The Colonial Period. Naval Craft, Privateers and Slavers, Revenue Cutters. The American Schooner, Merchant Craft, and Sailing Yachts, with a 27-page appendix of specifications and constructional notes. The sixteen admirable plates are reproductions of authentic plans and lines of important vessels such as the fast frigate *Hancock*, the slaver *Dos Amigos*, the clipper-ship *Rainbow*, the yacht *America*, and others. There are also some 200 sketches and plans scattered through the text, all of them very well done. These "lines," especially, make the book indispensable to the model maker.

The text is more than a mere history; it opens up fields for further research and for contention, it contains dissertations, anecdotes, and much of the romance of the sea. It is forthright and hesitates not in debunking some of our preconceived notions, as witness the following:

"There has long been a smug assumption on the part of American writers that ships built in this coun-

try were always noted for the excellence of their construction and workmanship as well as for their durability. It is a sad fact that this has never been wholly true, for American ships in any period exhibited but few examples, comparatively, that were on a par in this respect with English or French-built ships."

He later develops the thought that it was the superior model or design which, after the Rebellion, gave American craft their chief claim to fame.

Mr. Chapelle devotes much of his book to the matter of design and, thanks to the files of the British Admiralty and other agencies, goes far to remedy the lamentable shortage, in America, of authentic marine plans and original sources. This means that the book is fully documented and as free from errors of fact as it could be.

Deeply interested in the schooner, the author traces her development from 1730 down to the famous privateer of 1812, with cuts and plates that make the discussion clear to even a landsman. He deduces the conclusion that the Baltimore schooner was the great American contribution to marine design.

The study of clippers is especially interesting and instructive. The author maintains that, along toward the middle of her reign, the clipper was not the paragon of all virtue which some of us think she was, and that she was actually inferior to those of earlier and later design. The "extreme" clipper, as exemplified in the *Flying Cloud* was, in his opinion, not only no faster than the earlier type of the *Rainbow* but also was decidedly inferior to the type built after the Civil War. Of the latter, the beautiful Bath-built *Henry B. Hyde*, for example, was at least as fast as the *Flying Cloud* type and far more seaworthy, while her greater cargo capacity gave her a higher commercial value.

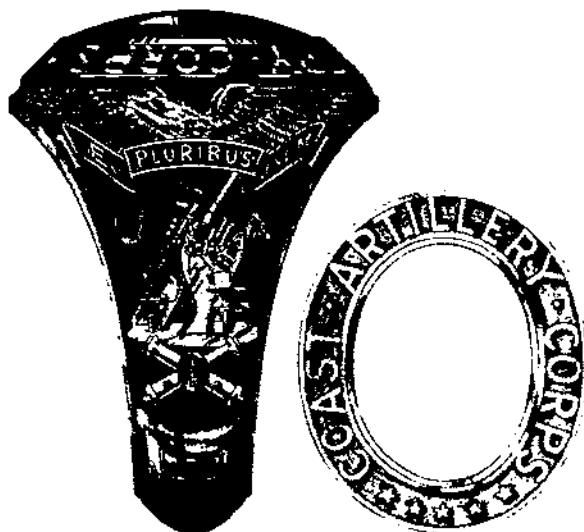
Just as we went through a "war to end wars," so this book will be one to end books on this particular subject. It is so good that this reviewer predicts the appearance of other books on this theme, written either in imitation or to controvert or develop some of the pronouncements delivered by Mr. Chapelle. In any case, the author gives evidence, throughout this treatise, of being not only a good sailorman and an indefatigable searcher for facts, but also a man with something to say and a fine ability to say it.

A REBEL WAR CLERK'S DIARY. By J. B. Jones.
New York: Barnes & Noble, 1935. 893 Pages; Two Volumes. \$5.00 the Set.

This is the only known complete daily account written during the war between the states. The author was a clerk in the Confederate War Office in Richmond. His writings have been used as a source of authentic information and local color in the preparation of such outstanding works as Basso's *Beauregard*, *The Great Creole* and Dr. Freeman's *R. E. Lee*.

Students of history and others interested in obtaining local color of the period will find this diary invaluable.

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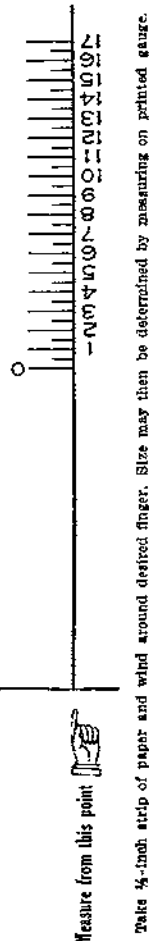
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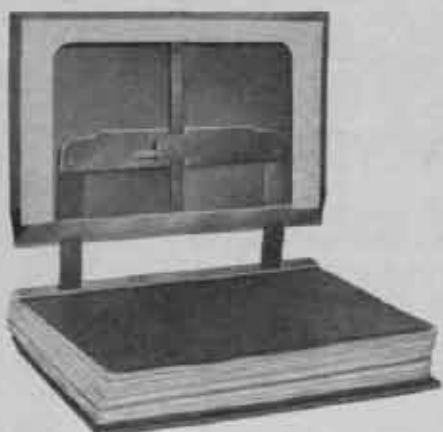
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